THE LANCET.

VOL. II.] LONDON, SATURDAY, JUNE 21, 1834. [1833-34.

UNIVERSITY OF LONDON.

LECTURES
ON
COMPARATIVE ANATOMY
AND
ANIMAL PHYSIOLOGY,

DELIVERED BY

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LECTURE XXXV.

ON THE MUSCULAR SYSTEM OF MAMMALIA.

THE muscular system and the living movements of *mammalia* are more varied than in any other vertebrated class, for some are organized to plough the deep or to clamber on the rocky coasts, some to burrow in the earth or to bound over the plains, some to gamble on lofty trees or cliffs, or to wing their way through the air, and these different conditions affect more especially the organs of motion. The muscles here are strong in every part, and proportioned to the massive bones and the ponderous trunks of the animals of this highest class. The lungs of mammalia being confined to the thorax, where they float loosely in the cavity, and are surrounded by the pleura, the diaphragm is more perfect than we find it in reptiles or in birds, and is developed, like most other parts, from the periphery to the centre; so that the respiratory system being less extensive than in birds, the temperature of the body is lower, the muscular contractions are less energetic, and the muscles compensate by their increase in bulk for their defect of energy, which gives a rotundity to the exterior form, and more massive proportions to all the parts, of quadrupeds.

The great whales and cachalots, and all the cetaceous mammalia, breathing by lungs like the terrestrial quadrupeds, require continually to ascend and descend in the water, and thus to have the muscles of their trunk very differently disposed from those of fishes, which are organized for horizontal movements through that element which they breathe. The great breadth and extent of the occipital region of the cranium afford a large surface of attachment for the muscles of their short neck, and for those which act on the vertebræ of the trunk. The length of the transverse and spinous processes of the vertebræ forms a large angular space on each side of the column, for those powerful muscles which move the caudal vertebræ and the tail. We observe, especially, in this region the spinalis and semi-spinalis dorsi, the splenii of the head and of the back, the multifidus spinæ, the longissimus dorsi, and a portion analogous to the sacro-lumbalis of higher mammalia. The inter-spinales and inter-transversales also assist here in the motions of the spine. The straight, the oblique, and the transverse muscles of the abdomen are here distinct, and the muscles which act upon the lower part of the column to bend down the tail, appear to be analogous to the ordinary muscles of the loins, the psoas, the iliacus, and the quadratus lumborum, on each side of the inferior spinous processes which protect the aorta. The muscles of their large scapulæ are also powerful, and so are the pectoral and deltoid muscles, to act upon the humerus, and move the pectoral members as one piece. The muscles of the os hyoides, the pharynx, and the exterior nares, are also remarkably developed, often embracing the expanded cavities, through which these animals can expel columns of water taken in by the mouth, or can breathe freely while the rest of their body is beneath the surface. Many muscles, we perceive, must necessarily be absent in these cetacea, from their want of posterior extremities. Many of the muscles of the pelvis and the muscles of the legs are here deficient. From the very limited motion admitted of

between the parts of the arm and of the hand, we perceive also that many of the muscles have received no development; and that we can scarcely perceive a trace of many of those of the fingers. The muscles, however, on the fore part of the trunk are here large and powerful, those both above the scapula and below it; and we perceive that the pectoralis major acts powerfully on the humerus, and the trapezius, the rhomboideus, the subscapularis, and the supra and infra spinati, act powerfully on the expanded scapula. We perceive that these fin-like arms are provided with that particular muscular apparatus which is best adapted for moving them, as an undivided organ, to give a more solid impulse to the water, directing their motions, balancing their body, and forcing it through the deep; that progressive motion, however, is chiefly effected by the horizontal tail. Some of those animals which feed on plants, have the muscles, particularly the flexors of the fingers of the hands, much more developed than you see in the blowing whales. This is the case with the lamantines and with the dugongs, which can climb with the hands upon rocks, so as to bask in the rays of the sun, like seals among the carnivora. Indeed the transition is gradual from the form of the muscular apparatus of these herbivorous cetacea to that of walruses, seals, otters, beavers, and other diving mammalia, and from these to the true terrestrial species. The cetacea, like the fishes, amphibia, and serpents, consist chiefly of the trunk, and by its muscles they are supported and moved in the heavy element they inhabit; but the land quadrupeds require stronger members and stronger muscles to support and move their heavy trunk in the light and unresisting element which they breathe. In the herbivorous quadrupeds the muscular energy is generally less than in the carnivorous species, and this accords with the inferior development of their respiratory and nervous systems, and the diminished activity of all their functions.

In the ruminating animals, from the still extremely simple structure of their extremities, many of the muscles which are developed in the extremities of carnivorous quadrupeds are entirely deficient, and from the small number and little flexibility of the toes, we observe, for instance, that the flexor and extensor muscles, which send down numerous tendons to the toes of carnivora, have here those tendons necessarily reduced in number, from the reduced number of the toes; and this is more remarkable in the solidungulous pachyderma, which walk on the point of a single toe.

In these heavy quadrupeds, the extensor muscles of the legs have generally a greater development than the flexor muscles; and this applies to most of the pachyderma. Many of them, destined to consume vegetable matter in great quantity, have the trunk of their body proportionally large, and presenting considerable weight for the pillars that are to support them. There is, therefore, a constant call on the extensors of the extremities of those animals, for the mere support of the heavy trunk. The body, however, being supported in the horizontal position by four members, much of the pressure is taken off from the posterior extremities, which we see applied to them in the climbing quadrupeds, and most in the semi-erect quadrumana and the erect forms of our species. The muscles of the hands and feet, with their long slender tendons, in the deers and nimble antelopes, are like those of birds, with their fleshy portions confined to the proximal parts of the extremities. They form a striking contrast with the muscular hands and feet of the carnivorous species, and both structures are equally adapted to their objects. This structure is the more easily effected in the legs of the light-footed ruminantia, from the shortness of their proximal bones and the lengthening of their canon-bones behind and before, along which the tendons of the flexors and extensors are braced to the toes.

There are no clavicles to separate the humeri in the ruminantia nor in the pachyderma, and the trunk of the body is suspended between the scapulæ by the strong *serrati* muscles, like a band passing across beneath the chest. Those muscles serve to connect the two scapulæ with the fore part of the sternum and ribs, and are often attached so far forwards as to reach several of the transverse processes of the cervical vertebræ. These form the chief connexion betwixt the scapulæ, and consequently the arms and the trunk of the animal, and serve to hang the fore part of the trunk to the scapulæ. Now the scapulæ are here brought very close to each other on the fore part of the chest by the want of clavicles, and the chest is thus narrow and compressed, presenting a carinated appearance in front. Thus the anterior extremities are by this means brought as nearly as possible under the centre of gravity, so as to support with more security the whole of the fore part of the trunk by the serrati muscles in these heavy vegetable-eating quadrupeds.

We observe that many of those ruminating quadrupeds have the head provided with very powerful horns, as organs of

defence, and supported by a neck, thick, strong, and muscular. This muscularity of the neck occurs partly in consequence of the increased weight of the head, and partly from the use that is made of those powerful organs as a means of defence. We see it in the bison, in the buffalo, in the bull, in the gnu, and in many other animals which use those organs as a means of defence. The same muscularity is observed in many of the larger pachyderma, from the great weight of the teeth, or tusks, or proboscis, or horns, or the general mass of the head itself. Most of the herbivorous quadrupeds have the muscles of the ears, the *attollens aurem*, and the *anterior* and *posterior auris*, powerful and large, to move those organs in different directions, so as to be made aware of dangers as much as possible before they approach. We perceive among them, as among several of the solidungulous pachyderma, that the exterior concha and its muscles acquire an enormous development, which appears to be connected both with the sounds they themselves emit, and with the imperfect development of their great cerebral centres. The organs of the senses are often large where those of perception are small. These muscles are powerful, and the concha very large, in the rhinoceros and in the elephants, especially of Africa. In aquatic species of quadrupeds they are generally very small, or wanting, and they are proportionally small in the higher mammalia where the brain is more perfectly developed, as in carnivora, quadrumana, and the human species. From the lengthened form of the face in many of these quadrupeds, to reach the grass, we observe all the muscles of the nostrils and the lips lengthened and enlarged, as the levator, the depressor, and the zygomatic muscles.

Many of the larger pachyderma, as the rhinoceros, the hippopotamus, and the elephant, which have the skin so remarkably thick and inflexible, that in order to move it rapidly, large muscles would be required to be appropriated to that use, appear to be almost destitute of the panniculus carnosus. The thickness of their skins in several of the pachyderma is a protection from the attacks of those numerous insects which infest the bodies of many of the more delicate-skinned ruminating animals. It is thus that we observe a great difference in the development of that cutaneous muscular apparatus in different forms of pachyderma. In some we cannot see it developed at all, and in others it acts on the humerus and on the femur.

We perceive, from the magnitude of the tusks of the elephant, and the use it frequently makes of them, and the weight of its molar teeth, that it requires to have the muscles on the back part of the head very powerful, and strongly connecting the head with the trunk, as well as on account of the weight of the proboscis and of the whole head. The nostrils were here lengthened to compensate for this shortness of the neck; and we find a repetition and division of the ordinary muscles of the nose here, to an immense extent, so that upon anatomizing this proboscis, we find nearly a thousand muscles, which cause these nostrils to appear so large that we are apt to regard it as an organ different from the ordinary organ of smell. Those numerous longitudinal, transverse, and oblique muscles, serve to compress, to shorten, and to bend on every side, the two nostrils of the elephant; so that the animal can use the proboscis as a hand, or to drink with. Those muscles require also to be provided with large nerves, which we see indicated by the large foramina through which they pass, the infra-orbitary foramina. We observe that several other of the pachyderma have the nose long, muscular, and flexible; this we see in the tapirs and the coati-mondis. The boars and pecaris require the muscles of the nose to be strong, on a different account. They have large hoofs upon the feet, by which they are enabled to scrape the ground in search of succulent roots, on which they feed; but we observe that they dig chiefly by that large trunculated cartilaginous disk which terminates the septum of the nose. We have already seen that the septum of the nose, at its extremity, is ossified, forming a distinct bone, which gives support to the upper dense cartilaginous part, which serves the animal as an instrument to scrape up the soft parts of the earth in search of food. This requires these animals to have the muscles of the nose, especially the levator alæ nasi, to be strong and large, and that their neck should be thick, short, and muscular, to give force to the digging instrument. These muscles are also powerful in the long flexible nose of the tapirs. The great magnitude of the iliac bones which we have seen in many of the large pachyderma, gives a broad attachment not only to the extensors of the femur without, but also to the *iliacus internus* and the *quadratus lumborum*, and the magnitude of all the muscles of their femur corresponds with that of the muscles attached to the surface of the scapula for the motions of the humerus. In the lighter forms of herbivora the pelvic and scapular bones and the muscles attached to them are alike lengthened, and their

members are moved with increased velocity but diminished force.

In the echidna, which digs for its food, we observe that the flexor muscles of the legs, especially of the fore-arm and hand, have a development greater than the extensors: and what we see here holds generally true with respect to digging quadrupeds. The anterior extremities are alone employed in digging, those extremities meeting with greater resistance to the flexors than the extensors. We find the flexors of the fore-arm and hand to be necessarily most powerful in these digging quadrupeds. We observe that in the echidna the panniculus carnosus is large and powerful, in order to give erection and fixity to those spines that are thrown over the animal's surface for protection. The animals with this strong kind of horny covering, so strong generally in animals that dig, as the *manis*, the *armadillos*, the hedgehogs, and many others that dig chiefly for insects, are thus protected from the dust which they are constantly turning up, and from the attacks of insects often swarming around them, or creeping over their surface. Now that panniculus carnosus serves to draw the extremities and the whole body together into a round mass, and to hold it coiled up, like a ball, while it is in that tense and protected condition. The skin, except in the lower parts, where it is generally soft and woolly, is strongly covered over the upper parts of the body; and the spines here are raised up and kept firmly in that erect position, which is the best condition of those spines, to serve as a means of defence to the enclosed animal. The ornithorhyncus seeks its food in the water, and its webbed feet indicate its aquatic life, and the swimming movements both of the arms and legs, exerting chiefly the muscles of the humerus and the femur. Most of the *edentulous* quadrupeds dig for insect food like the *echidna*, and have strong muscular short arms, with very large claws, and a lengthened tapering muzzle, capable of being thrust into the narrow crevices of rocks and trees, and into the nests of the insects they are pursuing. Their neck is generally muscular, to turn up the earth by pushing with the head. We observe the muscles of the os hyoides to possess great power and extent of motion, and the tongue itself to be of great length, flexible, narrow, often cylindrical, small, almost like a worm, copiously lubricated by the mucous secretion which it affords, and thus serving as an instrument of prehension. We observe that these edentulous animals are generally covered with dense scales, which are imbricated, or placed in such a way, that when the animal is coiled round into a ball, the delicate skin between the exterior scales is not exposed, for those scales are so large and close that they pass over each other like the slates on the roof of a house, and thus cover the whole exterior. When these animals are coiled round like a ball, they are protected by the scales covering the surface, and sometimes by sharp erected spines thrown up into a perpendicular and tense direction like so many sharp nails, and so as to leave no part of the skin unprotected. When we examine this covering we perceive that the panniculus carnosus is greatly developed for the forcible erection of these hard parts. It forms here a contrast with its condition beneath the dense hide of the pachyderma, for the dense hide of the pachyderma requires no such cutaneous muscle, as it forms a continuous tough mantle over the whole of the animal's body; but here that dense covering is divided into innumerable small pieces, which are moveable in the highest degree, and which admit these animals to coil themselves round until they are in the shape of a ball, when they sometimes allow themselves to roll down acclivities to escape their pursuers when hard pressed. The animal, in coiling itself up, draws in its head, then its extremities, and begins to roll up its trunk; and the posterior part of the body, prolonged into a broad tail in the manis, also folds round and covers over the whole exterior of the body, making it round as a ball.

The muscular system of the arms of the sloth is remarkable for the languid motions it exhibits, and which has been witnessed and described by many, and attributed to the almost reptile condition of the blood sent through their arms and legs. In them the blood is retarded in its passage to the muscles of the arms and legs by the trunks of the brachial and femoral arteries being subdivided into innumerable minute anastomosing vessels, which proceed around those trunks. Thus the circulation appears retarded by an increased space given for it to move in, as we see in the plexuses on the cerebral arteries of most animals; and this appears to have the effect of diminishing the irritability of those muscles of the extremities. This is no disadvantage to those animals, on the contrary, it is a wise provision, by giving them that tenacity of grasp which is so important for animals organized to feed upon that coarse kind of vegetable food on which we see them to subsist, and which they obtain upon the trees. They are thus enabled to hang, like the tree-frogs, for a long time by a single arm upon a branch of a tree, to collect

the food that is within the reach of their long arms and their long neck. Thus we observe, that by this languid irritability of the muscles of their extremities, they are gifted with a means of more securely, and for a longer time, holding by the branches from which they are suspended, to collect their leaves, and buds, and shoots.

Among the rodent quadrupeds we observe many curious analogies with inferior classes of animals, and particularly with the next inferior class, the class of birds; those we see in the skeleton, in the nervous system, and in many other parts, even in the glandular system. Now it is remarkable to observe that there is even some affinity in the living properties, and the general condition and forms, of the muscular system. The pterygoid muscles, so large and important in the feathered tribes, act here powerfully on the lower jaw, in giving it the horizontal motion we have already seen to be large also in birds, and to correspond with the magnitude of the pterygoid bones or processes of the sphenoid bone. Those muscles act in the rodentia also, not only with considerable force, but with great velocity. There is scarcely a quadruped in any other order which can be compared, for the velocity of all its muscular motions, with those of the order rodentia. You can scarcely, with the eye, follow the rapid motions of the lower jaw in the rodentia. While it is filing down some hard substance, it reminds us almost of some of the vibratile cilia of the water-breathing classes of inferior animals. This velocity of motion (and it is accompanied with strength) we find to be common to them with many of the movements of birds. We see the fluttering of the wings of the humming-bird, for instance, so quick as to be almost impossible to follow it. The humming-bird suspends itself in the air over the open flowers, with its long slender tubular beak insinuated into the flower. And covering, with their shining myriads, like polished metal or precious gems, some of the tropical woods in South America, where they chiefly occur, you would suppose they were hung with a string above the flowers; for they do not grasp the flowers—no part of them touches the flowers but the extremity of their long curved beak. When you approach them you see their little wings in a rapid and continued vibration, and they are thus engaged over the flower in sucking the honey from its interior. Now, the rapid motion I allude to we see again in the muscular motions of the insect tribes,—a remarkable analogy with the muscular properties in birds and rodent quadrupeds.

We observe in these rodentia, as in the inferior classes also, that the respiratory organs are proportionally large. Their large muscles are often very white, like those of the birds, which little exert them, and have less blood consequently sent through them. Many of the rodent quadrupeds are digging animals, digging for their food, or for safety under ground. This digging motion requires them to move forcibly and quickly the fore-arms and the hands from before backwards, a motion which calls into play very powerfully the muscles of the shoulders and of the wrists, and especially the pectoral and the deltoid muscles. The pectoral and the deltoid muscles are those which we observe here developed to a great extent, as they are developed in the birds, to move the humerus, to bring down the wing, and raise the inflated carcass of the bird, like a balloon, into the atmosphere; thus we see those muscles of the arms large in many of the burrowing rodentia. Even the vital and physical properties we observe to vary remarkably in the muscles of rodent quadrupeds, as they do in the muscles of birds.

In the marsupialia we observe animals possessing very different living characters, and differing altogether in their kinds of food and their whole habits. In the carnivorous species, as the *dasyuri*, we perceive altogether the muscular development for the motion of the lower jaw, for the claws and feet, for the arms and trunk, and the whole frame, which we see in the true carnivorous order of higher quadrupeds. We have burrowing forms in the *wombats*, flying species in the *petauri*, climbing species with prehensile tails in the *opossums*, scraping insectivorous quadrupeds in the *perameles*, and jerboa,—forms almost ruminating, in the *kangaroos*. But the muscular apparatus of the pouch and of the mammary glands and the nipples, is common to the order. We observe the pouch to be embraced externally by the panniculus carnosus of the abdomen, the muscular fibres of which serve, by their extension over the abdomen and the pouch to the symphysis pubis, to contract that cavity so as to embrace the newly-received young, and to preserve them while they are suckling. The two marsupial bones which we have seen, are in close connexion with the exterior portion of the recti muscles of the abdomen, as they are also in the monotrema, and are, therefore, entirely behind the posterior layer of the integument of the pouch and the mammary organs. This muscular apparatus of the pouch of the marsupialia is exterior to that which is destined for the compression of the mammary glands, and for the

compression of the ducts of the nipples. Those animals have the mammary glands placed along each side of the median plane within the pouch, and exterior to the recti abdominis.

There are distinct muscular fasciculi, which are appropriated to embrace and compress the mammary glands, and others more delicate, destined to force the milk from their ducts into the nipples and into the mouth of the abortive fœtuses, and thus to extend also the nipples from their ordinary retracted condition. The kangaroos have the coccygeal vertebræ much prolonged, and powerful, and accompanied by muscles for their motion, so strong as to bear the whole weight of the body, and even to force the body forwards by the tail, as by a fifth extremity, assisting in every leap. We observe the power and flexibility of that organ in the opossum to be such, that the animal is capable of twining it round the branches of trees, and, by its strong muscular apparatus, of suspending itself from those branches, and thus defending itself from injuries by the free use of its hands and feet, like an *ateles*. The young animals also make use of that flexible muscular organ for twining round the tail of the parent, in order to be carried aloft upon the trees, to escape from danger, grasping the fur of the parent's back with their hands and their remarkable prehensile feet.

In the carnivorous quadrupeds we observe the whole disposition and properties of the muscular system to differ much from those of the more timid and defenceless herbivorous animals. All their muscular organs are more perfectly developed and more powerful than we find them among the ruminating and other herbivorous mammalia. We observe this both in the increased vascularity of the muscles, and their high degree of irritability, and their great force, strength, and magnitude, in many parts of the body. We observe, from the subdivided form of the extremities, that the muscular apparatus there is necessarily more complex also, than it is in the ruminating quadrupeds, where two toes only reach the ground. The head of the carnivorous quadrupeds, especially of the numerous feline species, is, for the most part, short and truncated, and the temporal and masseter muscles thus act with greater force and effect upon the short jaws, so as to compress them with vigour, and break the hard bones or other substances placed between them. The muscles inserted into the lips, and those connected with the concha of the ear and with the eyeball, are here powerfully developed. The levator of the angle of the nose, and of the angle of the mouth, is largely developed; and the zygomatic, the orbicular muscles of the mouth and of the eyes, the pterygoid, the temporal, and the buccinator muscles, as well as the masseter muscles, are all strongly marked and powerfully developed, so that these animals have the means of readily uncovering their large tusks completely, and thereby preventing injury to the lips in seizing their prey, and to produce by the exposure of these tusks an intimidating effect upon their prey, by that snarling appearance and ferocious expression of the face which we see in most of the carnivorous animals upon being irritated, or when about to attack their prey.

The muscles of the neck, which connect the head of carnivorous quadrupeds with the trunk, are also powerful and strong, to carry their prey, or tear its flesh from the bones. We observe all the pectoral and scapular muscles to be large, corresponding with the great thoracic cavity, and the extent of the motions of the scapula upon the ribs. The whole of the muscles of the anterior extremities are remarkable for their strength, and correspond with the use made of those extremities in striking down their prey, in grasping it, and in holding it down, to be destroyed or divided. This seizing of the prey, and carrying it to caves to be consumed at leisure, requires that the muscles of the neck should be powerful and strong, and likewise those of the whole fore part of the body. The recti muscles of the abdomen, which have comparatively a limited extent in herbivorous animals and in the human body, here pass forwards to the anterior part of the sternum and the first pair of ribs, thus giving greater power in bending the trunk of the body forwards, when bringing down their forearms to strike their prey. The muscles of the legs are strong and powerful, and we perceive them capable of springing to a considering height upon their prey from their lurking places. The muscles by which their claws are exposed and inflected, and all their muscular apparatus indeed, we observe to be of great energy and strength, corresponding with the high development of their respiratory organs, and of their nervous system. There is a considerable difference in the class mammalia, in the extent to which the muscular part of the diaphragm is developed from the circumference towards the centre. It is most developed in the carnivorous quadrupeds; in herbivorous quadrupeds a larger portion of the centre of the diaphragm is tendinous. This is important as connected with the greater power and extent of contraction of that muscle, and its influence in the

quick and extensive respiration of those carnivorous animals. It is connected not only with their extensive respiration, but with the whole muscular energy of their system, and it is connected with the distance which there is between the heart and the diaphragm. The inferior cava, after perforating the diaphragm in the human body and in the higher quadrumana, is found to enter almost directly the right auricle of the heart, so that the heart lies close upon the diaphragm; but as you pass down in the quadrumanous animals to the muscular and ferocious baboons, you find the distance increases by the lengthening of the inferior cava above the diaphragm. Now this you observe to give rise to a greater freedom in the action of the diaphragm, and especially where it is most required, in those powerful animals the carnivorous quadrupeds. We see it in them often acting with great rapidity and force, without interrupting or injuring the free motion of the heart.

Among the insectivorous quadrupeds, we observe the hedgehogs covered externally with spines like those of the echidna, and analogous to the scales which we see covering the armadillos, and to the manes or quills of the porcupine. Now in the hedgehog the panniculus carnosus is as large for the bulk of the animal as it is in any other quadruped. It covers, like a mantle, the whole of the upper part of the trunk, and around its circumference there are circular fasciculi of fibres which act like a sphincter muscle when the parts are inclosed. When the animal withdraws its head its extremities and its tail close under the abdomen, the panniculus carnosus, thus drawn towards the whole fore part of the body, is contracted in front by means of the strong marginal sphincter band; so that all its parts are inclosed as in a spiny purse. It is by the action chiefly of the numerous dorsal fasciculi radiating from this panniculus carnosus, that the animal uncoils itself, because the panniculus carnosus acts by detached portions on the head, on the back part of the trunk, on the skin; and this spiny mantle appears to be connected with all the living conditions of the hedgehog, and also with its hybernating habits. Animals which burrow in the earth like the mole, have a more equable temperature, as we know the temperature to be more equable under the ground or under the water than it is upon the surface. The mole also finds a continual supply of food, in winter as well as summer, under the ground, in the worms, or the larvæ of insects which survive several summers and winters, and in the roots of plants. Insects are then in their caterpillar state, which they preserve for years, alike during summer and winter. Insects, indeed, pass the greater part of their life in this voracious and destructive worm state, they only assume the perfect imago state for a moment, to propagate and to perish. The mole requires, therefore, no particular provision for hybernating, till its food returns in spring. But the hedgehog lives mostly upon the surface of the ground, and gets its food in the forests among the roots of trees, and the crevices of rocks, or the banks of waters. When the cold winter sets in, and the animal becomes numbed, its respiration is for long intervals suspended, and its functions are performed with great languor; its insect food is gone, and it shrinks under some rock or among roots of trees. We however observe that it does not burrow under the ground like a mole, otherwise it would require no hybernating habits for its winter protection; but it coils itself up into a ball, is observed to creep into collections of leaves or some such matter, perhaps, to roll itself up between two rocks or among the fragments of branches of trees, and thus to pass in that protected state the severest months of winter, with its erected spines covered over with adhering leaves or grass, or other bodies which serve further to conceal it. The arms and hands of the moles, in all their solid parts, and in their muscular apparatus, are the most perfect digging instruments presented by animals, and from the advanced position in which the humeri are fixed, by the clavicles, almost under the head, all the adductor muscles of the arms, which are principally exercised in digging, act with double advantage and force.

The *cheiroptera* are quadrupeds with the arms organized for flight, and as most of them are predaceous, we observe those muscles to be most powerful, which move the humerus and which elevate the lower jaw. Their head approaches often closely to that of carnivorous animals. The muscles disposed around the mouth, and those of the jaws, are here strong and well marked. The muscles of the nose also, and frequently the muscles of the ears, the muscular apparatus of the chest, connected behind with the exterior and interior surface of the scapulæ, and with the whole anterior part of the thorax, are large and powerful in the bats. The muscles of flight act chiefly upon the humerus, a comparatively strong bone. The flexors of the wrist and fingers send down their tendons long and thin, so as to lighten as much as possible the distal extremities of their extremely lengthened hands, the muscular apparatus for the motions of the

hands being confined to the upper part, or proximal extremity, of the arm, as in birds.

The quadrumanous animals come nearest to man in the general disposition of their muscular system, and, consequently, the exterior form and proportions of their body; but there are characters by which their muscular system is marked, as peculiarly adapting them for their active movements, and their climbing habits. From the still lengthened form of the muzzle of many of the quadrumana, we observe that the muscles of the face have a more distant position from each other, and a more lengthened form; not increased in number here, or in the lower orders, but they are thus less crowded in a small space, and less capable of producing those minute modifications of expression on the surface of the face which are so remarkable in the short, naked, and fair features of the human face.

The quadrumanous animals are not destined for the erect position, but are organized for climbing in a semi-erect attitude, a motion which requires them to have a power of prehension in the posterior as well as the anterior extremities, and which requires the flexors to be more considerably developed than the extensors, both of the hands and feet. Thus we find in them also muscular shoulders and nates, and large pectoral and pelvic muscles; but many of the muscles which serve for the extension of the legs are much less massive and more lengthened than in man. The glutei muscles, so large in the human body, the recti femoris, the gastrocnemei, the muscles of the nates, the thighs, and the calfs of the legs, which are the chief extensors of the posterior extremities, are less developed and less required in the quadrumana than the flexors of those joints. Some of those animals, particularly the cynocephali, the dog-faced baboons, have their muscular organs very strong in the head and extremities; and these species possess a corresponding ferocious disposition and untameable character. We observe them to have instincts corresponding with this great muscular development—the instincts of animals always accompanying and being adapted to their general development.

Now, the last of all, and the most symmetrical and perfect form, is the human body, in which the muscular organs are constructed to maintain the trunk in an erect posture on the legs, and to give every variety of motion to the arms, to the hands, and to the head. The extensors of all the joints of the legs are more developed and required than the flexors, and hence the size and rotundity of the nates, the thighs, and the calfs. The muscles of the back, the extensors of the vertebral column, are also proportionally strong, and the muscles on every side of the neck, to support and move the heavy head. The pectoral and scapular muscles, and all the flexors of the arms and hands, are proportioned to the endless diversity of motions required in these free pendent extremities. By the shortness of the face the ordinary muscles are confined to a small surface, on which their actions produce impressions more varied, and more visible, from the nakedness, the softness, and the generally light colour, of the skin. The parts chiefly moved by these muscles are the angles of the mouth and the eyebrows. And the motions of those parts being regulated by present sensations, and associated with corresponding conditions of the mind, they become the chief seats of human expression, and in them we read the transient feelings of the mind, or the habitual tendency of the passions, or the inward workings of the soul.

AN ESSAY ON

THE ATOMIC THEORY.

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PART I.

EVER since I became acquainted with THE LANCET, now upwards of five years past, I have taken a lively interest in the chemical papers with which its pages were from time to time adorned, but during the whole of that period I do not recollect ever seeing an essay on the atomic theory, an acquaintance with which is so necessary to the medical student. It may be said, that the subject is amply enough discussed in the various class-books of that science to which students can refer. This I admit; but, at the same time, I think that a journal, which appears to be open to every division of medicine, ought not to be deficient in a subject which has, within these last five-and-twenty years, entirely changed the aspect of chemistry. Moreover, I do not know that I ever met with a book or paper in which the laws of the atomic theory were so fully developed as to be perfectly comprehensive by the mass of medical students. Of course, if they possessed the means of referring to every document on the subject, they might collect all the necessary information, but this is not in every one's power; and I believe that no person ever felt the want to which I refer more than myself. It is

partly on this account, and partly for the use of a friend, that I have written the following sheets, and I would fain hope that through their circulation in THE LANCET they will serve to supply the deficiency.

It is my intention, therefore, to treat of a subject which, according to Daubeny, has "exercised and baffled the ingenuity at once of the Hindoos, the Egyptians, the Phœnicians, the Greeks, the schoolmen of the middle ages, and the still darker 'metaphysicians of Germany.'" I shall give a short sketch of the progress of the atomic theory—of the notions of the ancients, and the learned middle ages, upon it—and of the various opinions which divided the scientific world, down to its real invention by Dalton. I shall state the several laws by which the theory of definite proportions is governed, the modes of determining the equivalent numbers of the elementary bodies, and the notions of Thomson, Wollaston, Prout, Berzelius, and Gay Lussac. I purpose, also, touching upon the defects of the atomic theory, explaining the laws of Gay Lussac's theory of volumes, and treating of the doctrine of isomorphism, of the bodies called by Berzelius "isomeric," and of Dr. Prout's ideas concerning merorganization. In the progress of the essay every opportunity will be seized of developing and adducing evidence in favour of the indivisibility of atoms, whilst the various arguments hitherto brought forward by the different supporters and opposers of this hypothesis will be amply considered.

Before I conclude this short introduction, I have to acknowledge the assistance which I have received from the writings of Dalton, Thomson, Wollaston, Prout, Berzelius, Faraday, Turner, Reid, Gay Lussac, and, lastly, the very learned Dr. Daubeny; for it must be remembered that, in consulting these various authorities, I only studied the interests of a friend and of the medical students. By compilation from the works of others, I have endeavoured to form a perfect paper on the atomic theory. I was anxious that the cream of all that had been written on this interesting topic, should be included in a single essay, in order that a few hours' reading and study might make the young chemist perfectly acquainted with all its laws. I am quite satisfied from what I have seen, that there are many who know nothing more of the atomic theory than its equivalent numbers, being totally ignorant of the mode in which they were first deduced, and who are utter strangers to the laws which govern and support this admirable doctrine. I have reasons to believe that this defect, in a great measure, arises from the want of a sufficiently complete paper on the subject.

Scarcely five-and-twenty years have elapsed since the Daltonian system of atoms issued from the laboratory of its immortal inventor. Whether we consider the advantages which it conferred upon chemistry, or the easier mode which it offered of accounting for the order and regularity of natural and artificial productions, it is an epoch in the annals of philosophy in which men of science will ever feel a lively interest. Beholding it in a chemical point of view, it must necessarily rank amongst the foremost of its splendid improvements, as it sheds a lustre upon that study of which few else can boast, and has certainly done more towards diffusing a desire for such knowledge, than any other single discovery. In point of importance, it will not give place even to the celebrated discovery of the mode of determining specific gravities, by Archimedes, or to the more modern one of attraction, by our countryman Newton. Its excellence has already been decided on by men of talent in every quarter of the world, and the truths founded upon it have been made out to be entirely free from all false and erroneous deductions, as such, and until we can discover a better way of estimating the nicety and regularity of nature's works, and accounting for the constant identity betwixt the productions of ancient days and the produce of the present, it would be weak in us to renounce it.

But the idea of matter not being infinitely divisible, can hardly be said to be of modern origin. The decision of this important question occupied the attention of many of the most celebrated philosophers of antiquity, and continued to do so from the age of Democritus, nay much earlier, down to the period when the mist of ignorance and superstition spread its baneful covering over the whole of Europe. Nor did the spirit of inquiry rest here. Philosophy, ever desirous of lifting her head, made the theory of atoms the subject of much discussion even throughout the middle ages, and though opposed by the metaphysicians of many parts of Europe, purely because of its simplicity, it still continued to linger on the minds of a few, down to the very time of its grand exposition by Dalton.

But in making this asseveration, I do not mean to say that the British philosopher was preceded in his invention. Far otherwise. For however the idea of matter resolving itself into indivisible atoms might pervade the minds of the ingenious before this age, it never remained with them

long, nor then was it grasped with that vigour which is consequent upon a discovery, the importance of which is constantly present to the mind. Up to the time of Dalton, the notions of men of science on this subject were exceedingly vague. There was a cloud before their eyes which they knew not how to dispel, and which at once hindered them from laying hold of the philosophic truth. They thought they perceived some light, some attraction about it, and, in all probability, it was this will-o-the-wisp appearance, which induced them to follow up the subject from time to time throughout so many ages.

Before I proceed further, I will briefly glance at the opinions which divided the scientific world respecting atoms, during the periods of antiquity, and also touch upon those which drew the attention of modern men of genius till the celebrated Dalton at once changed the aspect of this department of science, and overwhelmed and crushed all the various conflicting sentiments opposed to the atomic theory, which had hitherto existed.

It has been held by many, and amongst them by Bishop Berkeley, Bailly, and Professor Playfair, that from the numerous but detached specimens of science which have been handed down to us, there must have existed in the earlier ages of the world a philosophy rivalling, if not superior to, that extant at the present day. This philosophy appears to have been confined to the priests and leading men of the country where it was studied. India and Egypt are believed by most to have been the climes so highly favoured, the learning of the former being confined to the Bramins, whilst that of the latter was claimed by the priests. Nor is this notion altogether without foundation. The sages of Greece, as we learn from their own mouths, did not confine their knowledge to what was taught in their native land. They were in the habit of visiting Egypt, that storehouse of learning and the polite arts, to be there instructed in the mysteries which form so remarkable a trait in the characters of her priests. 'Twas from them that Pythogaras adopted his numbers, and from them that Plato, Aristotle, &c., attained that knowledge, the fruits of which they afterwards displayed to such advantage. Returning home, improved in most of the sciences, which must have been cultivated with considerable zeal in Egypt and India, it is not unlikely that they would feel desirous of inculcating some of those principles upon the minds of their fellow-countrymen, which claimed so large a portion of the attention of the priests and Bramins whom it had been their province to visit. Hence arose, in a great measure, that love of the arts and sciences in Greece, and from hence sprung those different ideas and studies, which held so conspicuous a part in that celebrated republic.

But laying aside this argument entirely, one thing is certain, that two opinions possessed the minds of the Grecian philosophers respecting atoms. The first was, that matter resolved itself into indivisible atoms, and the second, that the least conceivable particle of any substance, possessing parts, must be infinitely divisible. Of these two notions, the first perhaps met with the strongest support, and consequently was the subject of much discussion amongst its partisans for a great many ages. The whole body of believers in atoms were divided into three sects, and this division arose chiefly from the different notions which the three parties had respecting atoms. The headers of these various doctrines were equally celebrated, and as such, in that age, it would be a matter of some difficulty to discover which was the most deserving. At the head of the first and most distinguished were, Democritus the disciple of Leucippus, and Epicurus,—at the head of the second was Anaxagoras,—and at the head of the third stood the celebrated Empedocles. The disciples of Democritus and of the Epicurean school supposed matter to be composed of ultimate atoms, incapable of undergoing further subdivision,—of various shapes, but all possessed of similar properties, and that the innumerable varieties of matter were merely the result of different combinations and modifications of these atoms.

The followers of Anaxagoras were rather singular in their belief. They considered, in common with Democritus and Epicurus, that matter was resolvable into minute indivisible atoms, but they supposed that each distinct substance was made up of distinct particles, or rather atoms, which particles or atoms were possessed of similar properties to the aggregates of them. Thus, a bone, according to their doctrine, was formed by the union of a number of lesser bones; muscles of lesser muscles; blood by the union of drops of the same fluid, &c. &c. Hence arose the belief in the minds of the disciples of this school, that the Creator at first formed an infinite number of minute distinct particles, for the formation of every species of matter, and that each variety of substance had its distinct atoms originally developed by the fiat of the Almighty, solely for the support of the matter, which it strictly resembled, throughout succeeding ages.

The third and last opinion respecting

the indivisibility of atoms, was that of Empedocles. He maintained that all matter admitted of being resolved into four elements; viz. earth, air, fire, and water; by the intermixture of which in various proportions he supposed all other substances to be generated. Whether this was but part or the whole of Empedocles' doctrine I cannot pretend to say, but probably tradition has altered the aspect of it in some measure. Certainly it was modified by the future disciples of his school, for we learn from their own writings, that the four elements were not regarded by them as the primary and ultimate particles of matter, but that these even were formed by a condensation of ultimate atoms, and that fire, air, earth, and water, being thus produced, nature had the means of forming her own productions by the various unions and modifications of them. In other words nature did not attempt the moulding of anything to her own use, until the materials to be acted upon in her mysterious laboratory were provided from the mass of elementary atoms, like pure metal from the ore, in the shape of fire, air, earth, and water. Such being the opinions of those who professed to be the followers of Empedocles, it is not improbable that such were the notions of that philosopher himself.

Having now laid down the three great leading doctrines of the Grecian schools respecting the indivisibility of atoms, it will perhaps be advisable before I say anything of the philosophers who held a directly opposite opinion, that I just glance at the doctrines of Pythagoras on this subject. From the various versions of his opinions which have been supplied us by the followers of this eminent individual, it has always been a matter of considerable difficulty to determine what notions he held respecting atoms, and, consequently, his writings have seldom been taken by those who composed on the subject as the groundwork of any argument. Probably, however, I shall not be transgressing the bounds of truth when I add, that of the two doctrines, there is every likelihood that he believed in that which maintained the indivisibility of atoms. And this hypothesis will appear the more worthy of credit, when I remark that the Pythagorean doctrine of numbers seems to me to stand in the selfsame relation to atoms, as the bolder and more open sentiments of Democritus, Epicurus, and Anaxagoras. Be this as it may, the ablest interpreters of the Pythagorean philosophy seem to concur in the same opinion, and affirm, that his notions were not that matter was made up of numbers, which would be absurd, but that the Creator formed everything by numbers, that is, by atoms in definite proportions. Can anything be more expressive? To suppose that a man possessed of the talents of Pythagoras would harbour a supposition that matter, possessed of length, breadth, and thickness, was formed of invisible, incorporeal, immaterial numbers, is worse than the notion of Zeno, and afterwards of the Abbe Boscovich, that a substance material, and possessed of surface, might possibly be formed by the union of a number of points, themselves unextended and imperceptible. It would thus seem that instead of isolating the philosophy of Pythagoras on this abstruse question, we ought rather to rank it amongst its ablest supporters, and I conclude, from what has been said, that few will be hardy enough to believe that the doctrines of the Grecian sage admit of a better explanation, or one that better corresponds with the character and disposition of a man who was ever remarkable for his wisdom and piety; and, as Ovid observes of him,

Rerum causas, et quid natura, docebit.

In spite, however, of the authority of Democritus, Epicurus, &c., there were in Greece many other eminent philosophers, who maintained the opposite sentiments, and so certain were they of the justice of their suppositions, that they never thought the doctrine of atoms worthy of being controverted until they found it gaining ground throughout the whole of Greece. It is probably on this account that so little can be gathered from their writings on this subject, and, besides that, they looked upon the doctrine itself as too simple and void of metaphysical reasoning, a species of knowledge in which they most delighted, to be deserving a moment's consideration. They studied obscurity, and endeavoured with every kind of device to unfold whatever they knew, in abstruse and almost unintelligible characters. They thought it beneath their dignity to write in the language used by the ignorant and humble, and, consequently, any hypothesis founded on simplicity, as was the doctrine of atoms, they took care to disregard, or to hold up to the world as a species of quackery and fraud.

Amongst the believers in the infinite divisibility of matter, which was at one period the most prevalent theory in Greece, were Plato and Aristotle. The former accounted for the origin of things on the supposition, that from the very creation two principles had existed, viz., ideas and matter,—the different forms since assumed by the latter, being imprinted upon it by the former principle, which valuable quality, according to his dogmas, had ex-

isted in the mind of the Creator from all eternity. And these fine-spun notions seem to have satisfied the inquiring mind of Plato, as he does not appear to have considered the doctrine of atoms deserving his notice, and on that account seldom allowed it a place in his studies. That he never devoted his attention to this subject, cannot be denied, but then the time thus employed was so short and far distant, that it is next to impossible to decide, with any degree of certainty, what were the doctrines of the man, concerning atoms, who held such sublime ideas of the immortality of the soul. Sometimes one side of the question seems to have occupied his attention, and sometimes the other, but generally he leaned to that which maintained that atoms were infinitely divisible. From this apparent inconsistency in Plato's mode of reasoning, one thing, however, may be gathered, viz., that he considered the subject of the very least importance, for it is a general method with philosophers, and more especially with those of Plato's habits, when they stumble upon a theory worthy of further and deeper inquiry, to probe it to the bottom, to separate the seeds of truth from the husks in which they are enveloped, and, if possible, to bring together a mass of facts from what at first were, apparently, isolated ideas.

The next grand supporter of this doctrine was Aristotle. He opposed the opinion of Democritus regarding the indivisibility of particles, but agreed that matter might be made up of indivisible atoms, but that these last were not actually so, for he argued, that whatever we admit to be possessed of length, breadth, and thickness, must of course allow of further subdivision. In countenancing this beautiful doctrine, Aristotle pointed out the track to be occupied by his followers, and his dogmas having ever accorded better with the ideas of most individuals, both in his own and after times, than any other philosophy that was ever broached, we may form some idea of the power it would exercise over the understandings of men in that age. In a word, Aristotle's doctrine changed the aspect of science, and continued to hold the reins of knowledge down to a much later date than many of his opponents are disposed to allow.

In thus glancing at the sentiments of the philosophers of antiquity respecting atoms, I have endeavoured to be as concise and explicit as possible, though the several opinions which divided the ancients on this topic have rendered it impossible to draw up an explanation of their notions in as clear a light as might have been the case under other circumstances.

But we are not to imagine that these diversified doctrines ceased with the downfall of learning and the fine arts in Greece. By no means. They continued to divide the opinions of the learned throughout the middle ages, and were occasionally touched upon by the different men of science who appeared in various parts of the world from that period down to the very time when the theory, in its true and most acceptable colours, was broached by our Dalton. Amongst the more celebrated opposers of the atomic theory in these ages were, Des Cartes, Leibnitz, the Cartesians, Polignac, Keill, Kant, and the Abbe Boscovich; and the arguments advanced by them in support of their favourite sentiments, were not only in one sense incontrovertible, but brought forward with a determination which it was no easy matter to oppose. They were, however, if anything, rather metaphysical, and perhaps this single failing tended more towards their subversion than any other. The grand hinge on which the opposers of the Daltonian system have generally worked is the fact, that as long as we admit an atom to be possessed of parts, we must also grant that, in a mathematical sense, it is capable of undergoing further division, and it is, perhaps, this doctrine alone, which hindered the theory of atoms from being developed at a much earlier period. The trammels of this indisputable argument were thrown over the reasoning faculties of the most talented. The probability or improbability of such a fact really existing entirely escaped them, nor could they altogether rid themselves of the mathematical truth, either in one way or another. It was too plain to admit of contradiction. It had too many strenuous advocates to allow of its being trifled with, and though the opposite sentiments haunted them occasionally, they discovered that their own doctrine admitted of being better supported, though perhaps metaphysically, than the one beforetime adopted by Democritus, Epicurus, and Anaxagoras.

In order to escape this Scylla and Charybdis, one party, who may be said to have belonged to neither side, argued that it was not unlikely that matter was made up of points, in themselves incorporeal and immaterial, but that the matter, resulting from this composition, was possessed of extension and surface. Another class of philosophers alleged, that it was not improbable that matter was the result of the two opposite forces,—attraction and repulsion, thus at once doing away with the materiality of nature's works. Of the former of these doctrines, Boscovich was perhaps the founder, and

the latter, too, may be said to have sprung from the same source, though perhaps it did not in his time meet with that attention which it gained at a later period. But be this as it may, these several opinions continued extant until the appearance of the immortal Newton, whose notions on any subject, as might be expected, could not fail to create a considerable sensus in the scientific world. Fortunately for the theory of atoms, this deservedly celebrated philosopher adopted the same sentiments as Democritus and Epicurus. He sided with the idea of atoms, as they have always been termed (from the primitive ἀ and τεμνω, I cut) being indivisible, as he himself informs us in the following passage from his own writings:—"All things considered," he says, "it seems probable that God, in the beginning, formed matter in solid, massy, hard, impenetrable, moveable particles, of such sizes, figures, and with such other properties, and in such proportion to space, as most conduced to the end for which he formed them; and that these primitive particles, being solids, are incomparably harder than any porous bodies compounded of them, even so very hard as never to wear or break to pieces, no ordinary power being able to divide what God himself made one in the creation."

But in spite of the declaration by Newton there were not wanting individuals afterwards who chose to return to the old path. This was done partly from habits previously acquired by education, or to satisfy the cravings of a spoilt appetite after the dark, abstruse, metaphysical reasoning of former days. The proverb, "that men love darkness rather than light," was, in this case, strictly verified; for, as I have shown in a former part of this essay, they rejected the Newtonian hypothesis, purely because of its simplicity. His theory did not allow them to exercise sufficiently the metaphysical talents with which they were known to be gifted, and as they could not now keep the greater mass of the population in ignorance by the means formerly in use, and as knowledge, by the Newtonion system, was likely to become diffused, they used every endeavour to put down the atomic theory which they could possibly suggest, opposing its progress, and crying down the hypothesis, as absurd and untenable.

It was not, however, in England alone that the standard of opposition was so determinedly raised against it. The dark, gloomy, metaphysical reasoners of Germany, have always been remarkable for their love of mystery and obscurity, and on this occasion showed a more than usual antipathy to the Newtonian innovation. Kant, and the disciples of his school, declared for that theory respecting matter, most of the tenets of which had before been propagated by the Abbe Boscovich. They contended that matter was the consequence of two forces, contraction and extension, or, in plainer terms, attraction and repulsion, and believed that if the first power existed unopposed, all the works of nature would be contracted into a mere point, whilst, on the other hand, if the latter force was alone in being, they maintained that the materials composing the world, instead of being compressed into a nutshell, as has been since remarked, would be expanded equally over boundless space. In a word, the followers of this German philosopher occupied precisely the same position as different materialists have done both before and since. They considered the present sublime appearance of nature,—the snow-capped mountain,—the towering rock,—the whole produce of the animal, vegetable, and mineral kingdoms,—the boundless ocean,—the atmosphere,—and the bright blue sky, to be the result of a balance between the two forces, attraction and repulsion.

In this manner the scientific world continued to be divided till the establishment of modern chemistry. Aristotle's dogmas had remained paramount till the appearance of the celebrated Bacon, by whom it was at length overthrown, and in its place a system of reasoning introduced, which, from the countenance it afforded to experimental philosophy, was henceforth styled the Baconian or inductive method. Chemistry, being a science of experiment, received great assistance from Bacon's theory; in fact, one forwarded the other, and made more rapid advances in the field of philosophical inquiry than ever it had done before. All its departments being then studied and improved by experiment, many facts were hit upon, as might be expected from a plan, constantly pursued, of questioning nature, which afterwards proved not only of service to chemical science generally, but assisted greatly in clearing the way to a future discovery of the corpuscular theory.

This will appear the more certain, when I inform the intelligent reader that chemistry had scarcely begun to be studied scientifically, before it was noticed that substances, in whatever manner formed, whether by the hand of nature, or in the laboratory of the chemist, were always found to give out the same substances by analysis. Nitrate of potash, muriate of ammonia, and common salt, whether extracted from the earth, obtained from the sea, or artificially made, were universally found on analysis to contain the same

quantity of component matter. Fifty-four grains of muriate of ammonia were always discovered to be composed of seventeen grains of ammonia and thirty-seven grains of muriatic acid, neither a grain more nor a grain less, and it was invariably found that the more expert the chemist, the nearer he arrived at these conclusions.

Nor was this a solitary instance of the truth and universality of this law. Every salt, or even every substance that was submitted to analysis, yielded additional proofs of its accuracy, and displayed the fact in such a light, that it could not possibly omit attracting the notice of men of science at a future day. Another truth, equally remarkable, was also pointed out. It was found that when chemical affinity was exerted between two bodies, a substance having entirely opposite properties was the product. Thus, by the union of an acid and an alkali, a salt was obtained, which had neither the acidity of the former, nor the acrid, urinous taste of the latter, but a peculiar substance, denominated a salt, arising from the exact neutralization of the acid with the alkali. Before the experiment the acid had the property of reddening litmus paper, whilst the alkali turned turmeric paper brown, but the salt procured from their union could boast of no such quality, for on being brought into contact with either one or the other, the tests came out of the solution in the very state they went in.

Again, by the union of a metallic oxide with an acid, a metallic salt was obtained, as different in appearance as it is possible for any two diametrically opposites to be. For instance, what resemblance is there between the sulphate of iron, commonly called green vitriol or copperas, and the metallic base, iron, from whence it is obtained? Or, where is the similarity existing between verdigris and copper?

But this was not all. Combustible bodies might be procured from non-combustibles, supporters of combustion from those which extinguished flame, and matter possessed of acidity, from that which was tasteless and inert.

Chemical combination was long supposed by the majority of chemists to exist indefinitely, or in any proportion. This supposition arose, in a great measure, from the well-known fact, that a drop of oil of vitriol would mix with a gallon of water, or a drop of water with a gallon of acid, so that each drop of the whole fluid contained a portion of the acid or water diffused through it. Spirit will mix with water in any proportion, so will water with nitric, muriatic, or sulphuric acid. Whether the water be in the proportion of a drop, a gallon, or any other intermediate quantity, the combination seems to be precisely the same.

The universality of this law was, however, called in question by the important discovery that water will dissolve no more than a fixed quantity of any salt. At that point its dissolving power ceases. It means not what measures we adopt, it is impossible to persuade it to take up more. To be sure, when heat is applied, its dissolving powers are somewhat increased, but then, on allowing the solution to cool, that superabundance is immedintely precipitated, and remains unacted upon at the bottom of the vessel, whilst the quantity of salt held in solution, is exactly the same as before the solution was heated. Thus fifty grains of water will dissolve no more than twenty grains of sea salt. It will, however, take up any portion of the salt under twenty grains, from the lowest imaginable particle, through all the intermediate grades, up to the quantity specified. Hence the proportions, in which salt and water unite, cannot be said to be definite, nor, on the other hand, can they be said to be indefinite, because the substances in question will not unite at all after a certain point, the dissolving power of the water being then too weak to overcome the superior attraction of the particles of salt for each other.

Notwithstanding the opposition which the progress of the corpuscular theory encountered from the chemists who believed in the indefinite union of bodies, the law of definite proportions continued to be confided in by a few individuals, and though experiments were seldom made to determine the truth of this hypothesis, yet they did not yield up their belief to the more tenable one maintained by the opposite school. This determined spirit, however, had a great effect in forwarding the atomic theory afterwards, for we cannot but suppose that chemists would endeavour to settle the point of contention as soon as the improvements in analytical chemistry would permit them to make the attempt. And, as I have before observed, chemical science had not been long on the road to celebrity, before the truth or falsity of this law was made the subject of inquiry.

The first chemist of any note who took upon him to determine the composition of bodies was Homberg, the indefatigable German. His conclusions, however, owing perhaps to the scarcity of chemical apparatus, and to a deficiency in analytical skill, cannot be relied on, though they constitute a much nearer approximation to the truth than many that have since been made. About the middle of the eighteenth century, Bergman, who was in

the full blaze of his fame, both as a physician and a chemist, made a grand step towards deducing the atomic proportions of numerous compound bodies, and in such estimation were his opinions held, on account of the mathematical precision with which he was supposed to study every subject, that, at the time, his analyses were understood to have been conducted with such accuracy, as to be considered the only authority worth consulting. Bergman's deductions have, however, been since found to be very incorrect.

About this period the German chemist, Wenzel, stept into the field of philosophical inquiry. In this gifted and laborious individual, the admirers of the atomic theory may behold one of the few lights that assisted in furthering the future invention of the Daltonian system. His experiments, however, were unfortunately thrown into the shade by those of Bergman, since the celebrity of the latter gained for him that attention from other chemists, of which future investigations have proved him hardly deserving. Bergman's analyses were adopted by almost all the chemists of the day, whilst those of Wenzel, though ten times more accurate, were entirely thrown aside. To such an extent did authority and fashion shackle the minds of philosophers, that discoveries equal almost in point of accuracy and precision to those of a Wollaston, a Thomson, and a Berzelius, were disregarded and allowed to slumber for many years; whilst the analyses of another chemist, because he stood high on the rolls of fame, were swallowed without hesitation with all their defects.

The celebrity of Wenzel rests in the accuracy of his experiments, and in the useful ends to which he devoted his skill, for it would seem that he dedicated himself wholly to determining the truth of a phenomenon which had not only struck him, but which had moved the admiration and surprise of many other chemists of his day, viz., the exact neutrality which existed between certain proportions of two neutral salts after they had decomposed each other. As Dr. Thomson, in his "First Principles of Chemistry," has laid down this doctrine of Wenzel in a much clearer light than it is possible for me to do, I shall save myself the trouble of adding anything of my own, by transcribing the passage from the pages of that excellent work. He observes that

"Wenzel proved, by a long series of very accurate analyses, that all the alkalies and earths bear the same ratio to all the acids. For example, if a given quantity of sulphuric acid be saturated by

9.75 Barytes,
6.5 Strontian,
6. Potash,
4. Soda,
3.5 Lime,
2.5 Magnesia,

the respective quantities of those earths and alkalies which saturate a given quantity of each of the other acids, will be to each other as the numbers 9.75,—6.5,—6,—4,—3.5,—and 2.5. When nitrate of lime and sulphate of potash decompose each other, the nitrate of potash and sulphate of lime formed, are neutral, because the relative quantities of potash and lime which saturate a given weight of nitric and sulphuric acid, are the same. If we represent nitric acid by 6.75, then 6 potash and 3.5 lime, will just saturate 5 of sulphuric acid. Nitrate of lime (abstracting the water) is composed of

Nitric acid....	6.75
Lime	3.5
	10.25

and sulphate of potash of

Sulphuric acid....	5
Potash	6
	11

"When 10.25 nitrate of lime and 11 sulphate of potash are mixed, a double decomposition takes place, and there are formed

"Nitrate of Potash	Nitric Acid	6.75
	Potash....	6.
		12.75
"Sulphate of Lime	Sulphuric Acid	5
	Lime	3.5
		8.5

And these two salts are neutral because 6.75 nitric acid are neutralized both by 6 potash and 3.5 lime, and 5 sulphuric acid by 6 potash and 3.5 lime."

In affixing the above numbers to the different bodies,—as 5 to sulphuric acid, 6 to potash, 11 to sulphate of potash, &c.,—it is be understood that those numbers relate to the different proportions of the said substances, as 5 grs. of sulphuric acid, 6 grs. of potash 11 grs. of sulphate of potash, &c. Thus 5 grs. of sulphuric acid added to 6 grs. of potash form a neutral sulphate of potash 11 grs. in weight, wherein neither the acid nor the alkali predominates. From their union a salt is ob-

tained, possessed of properties betwixt the the acidimetry of the former and the alkalimetry of the latter, which neither reddens litmus paper, nor changes the yellow colour of tincture of turmeric to brown.

From 1777, the year in which Wenzel published his "Theory of Chemical Affinity," no further progress was made in the system of atoms until 1792. About this period, Richter, a Prussian chemist of great celebrity, following in the footsteps of Wenzel, his predecessor, was induced to examine into the accuracy of the positions assumed by his great master. After a great deal of labour, his ingenuity surmounted every obstacle. He proved the faithfulness of Wenzel's experiments, and added much to them, by determining the point of saturation of many of the acids and bases. He subjoined a table to his discoveries, illustrative of the facts he was desirous, of making known, and thus gave to chemistry, which had hitherto been a science explanatory of the qualities of matter alone, a form which enabled its followers to consider it according to mathematical principles. Being in this manner made a science of quantity, they might calculate on the issue of experiments with the utmost precision, and correct any errors resulting from deficiency in the experimental department of this sublime study. The following is an abridgment of this table:—

Alumina	525
Magnesia	615
Ammonia	672
Lime	793
Soda	859
Strontian	1329
Potass	1605
Barytes	2222
Carbonic acid	577
Muriatic	712
Oxalic	755
Phosphoric	979
Sulphuric	1000
Nitric	1405
Acetic	1480
Tartaric	1694

In explanation of this table it would seem that 2222 grs. of barytes saturate 577 grs. of carbonic acid, 712 grs. of muriatic acid 755 of oxalic acid, and so on; and in like manner that 1694 grs. of tartaric acid saturate 525 grains of alumina, 615 grs. of magnesia, 672 of ammonia, 793 of lime, &c. Add to this, that the proportions of each of the other acids and bases, specified in the above table, are effected in a like degree. Richter's experiments, however, were not confined to these; he attached numbers to a great many others, and thus established a law which later researches, notwithstanding the inaccuracies of the experiments of its founder, have confirmed and verified. This doctrine of Richter, however, met with as little notice as the brilliant discovery of Wenzel.

Whether this apparent apathy amongst philosophers was owing to the great want of exactness in Richter's statements, or to other causes, cannot now be determined; but certain it is, that upwards of thirty years were allowed to elapse before any attempts were made either to prove their truth or to extend them. Chemists at this time seemed altogether ignorant of the existence of such a law as that of atoms. The experiments neither of Bergman, Wenzel, nor Richter, though certainly demonstrating the existence of such an opinion in their minds, had done enough to strike out from the anvil of science, a shadow of the corpuscular theory. The great body of scientific men still continued unmoved. The attainments of the few being not less than a century in advance of the many, the coldness and apathy after improvement, and the stupidity everywhere displayed, were such, that it was next to impossible for the endeavours of Wenzel and Richter to kindle the embers of science, or to make the ideas of the rest of mankind keep pace with their own. They appeared so besotted with ancient doctrines and opinions, as to be unable to place a right value upon the discoveries of their own day, and either from envy, or a desire to restrain the progress of knowledge, they seemed as though they could not estimate the advantages of any improvement, or were otherwise totally ignorant to what purposes it could be applied.

This dulness on the part of so large a portion of the community was undoubtedly a great drawback to science, for it is a fact which may not be contradicted, that could the ideas which such men as Bergman, Wenzel, and Richter, first struck out, have been received and followed up by those about them, the atomic theory had been established long before the principles of it were known to exist. Unfortunately, such was not the improved state of knowledge, for not until thirty years after this was the corpuscular theory touched upon; and then it was handled so slightly that we are tempted to believe that the person before whose vision it was allowed to pass, was altogether ignorant of the importance of his own opinions. This was no other than the celebrated Mr. Higgins, professor of chemistry in the University of Dublin. Such were the talents and the strength of this man's

mind, that in all probability, had he hit upon the subject a few years later, his comprehensive genius would have glided over the mysterious sea, and his own brow have been adorned with those laurels which Dalton himself now wears. The cloud which darkened the eyes of philosophers might have been dispersed, and, as Virgil says—

> Cùm circumfusa repentè
> Scindit se nubes, et in æthera purgat apertum
> Restitit Æneas, claràque in luce refulsit;

and Higgins have arrived at that celebrity to which it has been the fortune of the British philosopher to attain.

After the promulgation of the atomic theory by Mr. Dalton, Mr. Higgins seemed to awake from the lethargic sleep into which, at a most critical season, he had suffered himself to fall. He then became anxious to secure to himself the honour of a discovery which in reality belonged to Dalton alone, and in support of his pretensions, again brought forward facts relating to this subject, which he had published upwards of twenty-one years previously. Certainly, in his singular work, entitled "A Comparative View of the Phlogistic and Antiphlogistic Theories," he holds, that "in volatile vitriolic acid, a single ultimate particle of sulphur is intimately united only to a single particle of dephlogisticated air; and that in perfect vitriolic acid every single particle of sulphur is united to two of dephlogisticated air, being the quantity necessary to saturation." He also makes several other observations on the union of bodies, atom to atom, and throughout seems to adhere to the Daltonian system.

But for all that, these sagacious remarks of Mr. Higgins bear but slightly upon those which were afterwards made by his coadjutor, for from the very careless manner in which he alludes to them, the reader is tempted to believe, however near they approach to the atomic theory, that he was altogether a stranger to their importance. Indeed he appears to have never thought deeply on the subject, and as such, Dalton's claims to originality are not in the least affected. In spite however of the unfeeling remarks thrown out by the opponents of Mr. Higgins, one cannot help being interested in his sagacity, though at the same time we must all conclude with Dr. Macneven, "that celebrity without labour is neither legitimate nor attainable in the walks of science, and that the fame of a discovery belongs rightfully to him who is not only the most sedulous, but also the first to promulgate and apply it." This is Mr. Higgins's case; for his suggestions were not only scanty, but brought forwards with so much carelessness as at once to escape the reader's attention, and to show, in case they were perused, that the writer himself was but very slightly interested in them.

Hitherto the corpuscular hypothesis seems to have attracted the attention of the philosophic world in a very inferior degree. I have endeavoured to point out its first dawnings amongst the Bramins,—amongst the Egyptian priesthood,—and the sentiments held upon it by the sages of ancient Greece. I have laid down the different notions which were in vogue amongst the philosophers of the middle ages, and amongst the metaphysicians of Germany, and throughout I have endeavoured to prove, that to all these sects the atomic theory was nothing but an enigmatical study, which continued to puzzle and baffle the ingenuity of men of science down to the time of Dalton. It was the shadow of a system which they could not grasp. They thought they perceived its importance, but could not decide with certainty. They endeavoured to contemplate it,—they examined into its laws, but to their amazement every supposition which was hazarded appeared to be borne down by a more weighty one from the opposite side. Their knowledge as yet was too shallow to admit of their reasoning upon the subject with any chance of success, and, as every one knows, nothing which is hit upon in the dark can be held firmly. I have also explained that after the darkness of the middle ages had passed away, philosophers still seemed as undecided as before. An individual now and then took it upon him to support the doctrines which had been promulgated by the Epicurean school, but then he was sure to encounter tenfold opposition, in consequence of which his opinions were overwhelmed and crushed as soon as its supporter left the field. During the period which elapsed from the commencement of the reformation to the establishment of the Daltonian hypothesis, scarcely a single individual of celebrity, with the exception of Bergman, Wenzel, and Richter, adopted the corpuscular system. Certainly Newton advocated its claims with considerable talent, but then, like Mr. Higgins, he seems to have attached but little importance to it. He however adopted the notions held by the followers of Epicurus, and served as one of the grand marks for tracing the existence of such an opinion from the early times of the Hindoo philosophy to its real promulgation by Dalton. In this, as in many other instances, Providence seems to have directed that the great discoveries which it was her intention to

grant to mankind, should never be entirely lost sight of, and thus we often perceive when a subject appears to lie most dormant, which perhaps at a previous season had awakened the sensibility of its advocates, that it is again stirred up to active life by some unforeseen and unexpected occurrence. In this instance the idea of the existence of indivisible atoms seems, from various circumstances, to have been handed down from the earliest ages, and the Bramins, the Egyptian priesthood, the sages of Greece, the schoolmen of the middle ages, and the metaphysicians of Germany, were nothing more than the instruments, like Newton and Higgins, in the hands of Providence, to draw the casual attention of the learned to a subject, the fruits of which it was her wish to confer upon them, when the wider diffusion of knowledge should render them capable of receiving it. Until the arrival of this eventful period, it was necessary that the understandings of the learned should be occasionally directed to it, in order to prepare the minds of the rest of mankind for its genuine invention.

After Higgins had stirred up the embers of this apparently dying flame, it was again allowed to sleep for a few years, and then the season for making it generally known having arrived, Dalton appeared on the stage of philosophical inquiry.

(*To be continued.*)

CASE OF

DROPSY OF THE PERITONEUM

OF ELEVEN YEARS DURATION, CURED BY INUNCTION WITH

HYDRIODATE OF POTASH AND MERCURY.

By W. BEVAN, *A. M., M. R. C. S. I., and one of the attending Surgeons to St. Peter's Parochial Dispensary, Dublin.*

MARGARET POWLAN, ætat. 41, servant, of a robust and healthy constitution, having run through the ordinary course of pregnancy, was, in the month of February 1823, admitted into the Dublin Lying-in Hospital, when, the labour being a protracted one, she was delivered, per force, of a dead child. Contrary to the consent of the attending physician, she went out prematurely, and returned immediately to her situation.

About seven or eight months after, being *enceinte*, she perceived that she was larger than usual under the circumstances, and that there existed an evident division between the upper and lower halves of the abdomen. Having gone her full time, she was delivered of a still-born child, and immediately after delivery observed that she was scarcely if at all reduced in size, which was considerable. Soon after this she again became pregnant, and in due time was safely delivered of a *living* child. Nothing, however, during this long period had been done for the extra swelling of the abdomen, which had become much larger, and continued to increase. A third time she became pregnant, and after the usual period was a second time delivered of a still-born child. This occurred four years after her first accouchment. As yet, also, nothing was done for the tumour, which continued to enlarge.

Unwilling to consent to the use of any remedy, and not imagining that she was dropsical, two years subsequent to this time, having ceased child-bearing, and having become very helpless, and being incapable of motion, she applied to a physician, who gave it as his opinion, that she really was dropsical, and that she must immediately be tapped. To this she consented, and the operation was accordingly performed in the presence of three attendants, when thirty-nine quarts of a limpid serum were drawn off. From that period to the present time she has been tapped once in each year, except the last, when it was performed thrice, in consequence, as is usual, of the more rapid and frequent effusion of fluid. On an average, eighteen quarts of water were evacuated each time. In two instances none could be obtained.

In the beginning of January of the present year, the tumour having again increased much and rapidly, I was applied to, by her attending physician, to perform the operation, when we drew off fourteen quarts of a thickish serum. Much difficulty and resistance were experienced on introducing the trocar, the integuments being very dense, and the peritoneum feeling as hard as pasteboard. I did not succeed in drawing off all the water at this time; a third part still remained. A flannel roller being applied, and a portion of the *Decoct. Seminis Lini.* being directed to be taken daily (the urinary secretion having been some time suspended), we left her.

Subsequently, on inquiring into the history of her case, I found that during the long period of ten years, her health had not materially suffered, that the uterus, the catamenia being always regular, the kidneys, and especially the liver, had performed their functions well. I, therefore, concluded that the disease had its seat and origin in the peritoneum, in consequence of latent inflammation, which

conclusion its thickened and diseased state warranted me in drawing. With this view of the case, I directed her to use the following ointment:—

℞ *Ung. Hydriod. Potassæ; Hydrargri. Fortius Sing.* ℥ss. Fricatus drachma mane nocteque abdom.

Three weeks after she had discontinued the use of the ointment, and finding that the swelling had rather diminished than increased, I determined on drawing off the remainder of the fluid, which I accordingly did, when thirteen quarts of a thickish brick-red-coloured serum flowed out. I was much surprised to find the abdominal parietes this time quite relaxed and pliable. This enabled me to take away the last drop. Having applied a tight bandage, and directed her to remain at rest for some days, I desired that she should take exercise; since which she has resumed her natural dimensions, has returned to service, and continues to improve in health, and no disposition seems to exist at present to renew the disease, a period of five months having now elapsed.

On a review of this case I consider it to be interesting on two accounts. First, that during the unusual length of time in which this individual was dropsical, there was a total absence of symptoms of injury in the other organs, particularly the stomach; the menstrual flux also being singularly regular throughout. Secondly, the remarkably quick and rapid effect produced by the ointment. This I conceive was due to the hydriodate, its now well-known power on the constitution of thinning and emaciating, being strikingly shown in this instance. But I think that it possesses, in addition, a much more valuable property, that of altering the diseased action of a part, which I consider was manifested in this case by the marked alteration in colour of the fluid. This also occurred in a case of ovarian dropsy treated with iodine by Dr. Elliotson, and also by Dr. Thompson of London, who (though I was ignorant of the fact till I had consulted the journals) have used this substance as a remedy in this form of disease, often with success. Dr. E. in his lectures has given some useful and judicious directions on its use, and has, I think, observed that it is likely to prove a good and valuable remedy. Let me, however, add, that much caution and circumspection should be observed in using it, either internally or externally, as, both from its rapid effects, its action, and its decided tendency to engender an inflammatory state of the system, dangerous consequences may ensue. I would further remark, that when it is perceived in a case of dropsy that iodine has manifested its effects, the radical cure may be very much hastened by drawing off any remaining fluid,—probably the last time the operation will be necessary. The evil consequences arising from a lengthened use of the remedy may thus be obviated. Lastly, I would add, that I think iodine is materially assisted in its action by combining it with mercury.

Dublin, June, 1834.

SEVERE HEMORRHAGE FROM AN ULCER ON THE PENIS.

To the Editor of THE LANCET.

SIR,—If the following case is worthy of insertion, you will, perhaps, give it a place. I am, Sir, your very obedient and humble servant,

FRANCIS COOPER.

Southampton, June 13th, 1834.

CASE. —— Coombs, about twenty years of age, sent for me to stop a bleeding which had taken place from the penis. He was a stout healthy young man, and had had hemorrhage several times for two or three days previous to my seeing him, but since this last occurrence he had become so completely exhausted as to be unable to stand. I examined the vessel on my arrival into which the blood had been received; it contained about two pounds or more of arterial fluid, and which only ceased to flow on the approach of fainting. A large clot filled up the lips of the prepuce, which was swollen and inflamed, and nearly closed over the glans by a phymosis.

He stated that he had lost a larger quantity of blood by the previous bleedings, and, judging from his appearance, I should say he certainly had sustained a considerable loss of that element, since he was blanched, and almost unable to move.

After drawing away the coagulum, I introduced the blade of a curved pair of scissars, and slit the prepuce as far as the margin of the glans, when, on reflecting its divided edges, a large chancrous ulceration, comprehending a third of the corona and body of the glans, was exposed. After washing the parts, the nitrate of silver was freely applied, so as to act as an escharotic; a piece of dry lint was placed over the sore, and the penis was covered with rags dipped in cold water. By the next day the slough came away, and no hemorrhage ensued.

The chancre then gradually healed, and the division in the integument can scarcely be seen. In this case, the patient himself would have it that he had lost six or eight pints of blood, but it is possible that four pints would be nearer the truth. At all events the quantity must have been large, and not far short, if at all, of the last-mentioned amount.

In a recent number of THE LANCET, a similar case is noticed by Mr. Wardrop in one of the lectures of that excellent and practical writer, but in his case Mr. Wardrop bled the patient from the arm, to induce syncope, a remedy which, under particular circumstances, may be resorted to. But with proper deference I would observe, that I conceive a free application of the nitrate of silver to be sufficient, almost under every circumstance, to arrest the hemorrhage, unless the particular views of the practitioner favour the plea of additional bleeding, to prevent further ulceration, which I beg again to believe may be effectually prevented by cauterizing the wound freely with the above-named substance. I do not like to see blood wasted, but when necessary, let it be removed to any extent compatible with sound practice and the safety of the patient. If great inflammation be present, Mr. Wardrop's practice is judicious; but I would cauterize the wound as well. Wherever specific ulceration is going on, whether in the integument or cellular tissue, the nitrate of silver properly and judiciously applied is the best and often the only remedy.

LITHOTRITY.—We have been favoured here with an operation of lithotrity by Mr. Costello. The patient, an old man, did not appear to suffer much. The tact with which Mr. Costello seized the stone was admirable; there was no *searching* for the *foreign body*, but the blades of the instrument (his own) appeared to be passed with the greatest possible facility under the calculus. A few strokes of the hammer announced the approximation of its blades, and the comminution of the stone. The sitting did not exceed five minutes. I confess I always had some prejudice against lithotrity, but candour compels me to admit, that that prejudice is removed. No man can reflect on the immense saving of suffering to the patient, and the danger as well, by lithotrity, without hailing it as one of those triumphs of human skill which occasionally take place for the relief of humanity, and as an elevation of our art above every contemporary science. There is little doubt but that the operation of cutting will, in a few years, be exceedingly rare; indeed, it occurs to me as being unjustifiable, except in peculiar cases, to cut at all, since lithotrity, in a majority of individuals requiring relief, seems to fulfil every indication; and although, like every discovery, it requires time for its general adoption, it is to be hoped that no operator will attempt a section of the bladder for the time to come, until he has ascertained its necessity, and made himself well acquainted with the respective merits of both modes, since nothing less than life is at stake in one, and only physical suffering in the other, a difference which is surely entitled to some consideration. However prejudiced and partial the lithotomist may be, I should like to see more humility and compassion in medical men at public operations. Is it necessary that every man *should satisfy himself* of the presence of stone, by rudely manipulating the sound, and forcing it against the sides of the bladder? Do such men think that a poor creature has no feeling? If so, let them strip and place themselves on the table, and if they will allow me, I will soon convince them to the contrary.

CASE OF

"SPONTANEOUS EVOLUTION"

OF

THE FŒTUS.

By JOHN THURNAM, *M.R.C.S., London.*

ALTHOUGH *the spontaneous expulsion of the fœtus, in cases of arm presentation*, or, as it is more generally called, its "*spontaneous evolution*," can scarcely be considered rare, after the number of cases that have been recorded by intelligent and accurate observers, yet when we are told by Dr. Burns that even in Glasgow, "not more than two cases have ever happened," we are, I conceive, hardly yet justified in considering the relation of such cases to be superfluous.

In taking down the following notes of this case when it occurred, I had a view of submitting them to the notice of practitioners through the medium of one of the periodicals, but have hitherto neglected doing so. Seeing, however, Dr. Malcolm's paper on the subject in the last number of the *Edinburgh Medical and Surgical Journal* in which he urges the propriety of such cases being put upon record by those practitioners who have met with them, I no longer defer placing the notes, such as they are, in the columns of THE LANCET.

Amelia Pyefinch, residing at 56, Wardour Street, Soho, was seized with labour pains, early in the morning of the 26th of

January of the present year, and I was summoned to her assistance. This was her second labour, and the commencement of the eighth month of her pregnancy. On entering her chamber, I found the uterus contracting violently, as I was also informed it had been for about an hour. Upon making the usual examination I found a large bag, formed by the membranes containing the liquor amnii, presenting as low down as the os externum. I was, however, perfectly unable to detect through these the presenting part of the fœtal body, and the same difficulty existed on my introducing the hand into the vagina, notwithstanding the os uteri was fully dilated. I had only just completed this investigation, when the membranes were protruded, which, so far as expelled, amounted, with the contained fluid, to about the usual size of the fœtal head. These being ruptured by the next uterine contraction, and about a pint of the liquor amnii having escaped, on again introducing my fingers, I found that one of the great ginglymoid joints, which proved to be the elbow, was down in the vagina, almost as low as the os externum. I immediately proceeded to endeavour to introduce my hand into the uterus, in order to turn, but owing to the shoulder being wedged in the outlet of the pelvis, as well as to the powerful and repeated contractions of the uterus, I found it to be impracticable, and was compelled to desist, not however without hopes,—taking into consideration the stage of pregnancy,—the activity of the uterine contractions,—and the evident death of the fœtus, that its expulsion might take place without instrumental aid. That these hopes were not unwarrantable, was proved by the effects of the very next uterine contraction, for by it the dead fœtus was expelled in the following manner:—First, the presenting arm and shoulder were expelled, then the trunk, doubled upon itself, with the shoulder and arm of the opposite side; these were immediately followed by the breech and inferior extremities; last of all the head itself was protruded. The whole was accomplished in less than half an hour after my entering the room.

In this case there was not the least attempt at retraction of the arm, although the efforts which I made to introduce my hand, would have favoured any such tendency had it existed; and the expulsion of the body of the fœtus, doubled upon itself, took place immediately after that of the shoulder had been effected, without any great impediment, and without occasioning any uncommon degree of pain to the mother. It will hence be observed, that this case fully confirms the explanation of the mechanism of this (view it as we may) extraordinary phenomenon in parturition, as given by Drs. Douglas,* Gooch,† Burns,‡ and Jewel,§ and that it is equally opposed to that first offered by Dr. Denman, and more recently supported by Dr. Kelly.‖

I make use of the term "spontaneous expulsion" (understanding it of course to be restricted to "cases of arm presentation"), in preference to the more common one of "spontaneous evolution," as the latter appears to be founded upon an erroneous view of the subject, and, if it be so, can only be regarded as calculated to perpetuate an error.

London, June 17th, 1834.

PATHOLOGY OF

ACUTE HYDROCEPHALUS.

To the Editor of THE LANCET.

SIR,—In perusing in the last Number of THE LANCET a paper by Dr. Alexander of Manchester, on "The Cerebral Pathology of Children," I met with the following paragraph;—"Acute hydrocephalus, I shall venture to define as a specific inflammation of the brain, leading to serous or lymphatic effusion." To understand this definition rightly, it is necessary that we be apprised of the generic character of inflammation, for upon this point pathologists are not agreed, and then that we be informed, what, in the present case, constitutes the specific difference, for, of course, the definition of a species embraces all the characters of the genus, together with the specific addition. Until this is done, the proposition is a mere vague assertion, destitute of any precise meaning. Dr. Alexander then divides the malady into three stages, "a *congestive*, an *inflammatory*, and an *effusive*." Is the congestive state a state of inflammation? If not, it does not possess the specific character of the disease, and can be no part of it. How does the effusive stage differ from the second stage? If it be not inflammatory, it comes not within the definition of the disease, and, consequently, can form no part of it. But Dr. Alexander says, "it does sometimes doubtless happen, that an

* An Explanation of the Process of the Spontaneous Evolution of the Fœtus, &c. By John C. Douglas, Dublin. 2nd edit. 1819.

† Medical Transactions of London. 6th vol.

‡ Principles of Midwifery. By John Burns, M.D. 8th edit.

§ London Practice of Midwifery. 6th edit. 1832. By George Jewel, M.D.

‖ Essay on the Spontaneous Evolutions, &c. 1816. By John Kelly, M.D.

effusive state has supervened without a preceding inflammatory or even congestive state." What! a disease to have arrived at its last stage without having at all possessed the *essential* character of that disease, the *specific* inflammation spoken of? But if hydrocephalus can possibly take place without inflammation of the brain, then inflammation is not necessarily the cause of it, and the definition is not an accurate one, in whatever way the word inflammation may be understood. Is it not better to restrict the term hydrocephalus to its proper etymological signification, and then to inquire from what causes the effusion may arise? We shall find, I think, that even if inflammation is at any time the cause, it is not the only or frequent cause of the effusion; but that this may take place under conditions of the brain very different from inflammation. I may ask whether hydrocephalus is not distinguished from inflammation by the effused fluid being limpid and uncoagulable, whereas in inflammation it is coagulable, and frequently purulent.

Whenever the circulation in the brain and its membranes is, from whatever cause, increased, a corresponding increased exhalation will take place into its serous cavities. The cerebral circulation is frequently increased by sympathetic influence of diseases in other parts of the system, without itself partaking of disease, and this more readily happens in weakly children, on account of the greater degree of irritability which exists in them, than in children of a more healthy frame. Debility, therefore, may be considered a predisposing cause of the hydrocephalic effusion.

Our practice is usually greatly influenced by our notions of pathology, and it becomes important, therefore, that they rest on a solid foundation, for it is better to govern our practice by empirical knowledge than to found it on false and erroneous hypotheses? Is, then, hydrocephalus correctly defined by Dr. Alexander to be a *specific* inflammation of the brain? Before I admit the validity of this conclusion, I require something more than mere assertion, I require the proposition to be *proved*. I am, Sir, &c.

INCREPANS.

June 12, 1834.

NEW DEFINITION OF FEVER.

Fever may be defined:—A succession of paroxysms, regular or irregular, similar or dissimilar, occurring at equal or unequal intervals, independent of the renewed or continued application of the original cause.

A Paroxysm comprehends three specific stages, a cold, a hot, and a sweating stage.

A regular paroxysm is that in which the three stages are distinct and perfectly developed in the above order of succession: the transition being from the cold (which is the primary stage) into the hot, and from the hot into the sweating, which is the natural and also critical solution of the paroxysm.

An irregular is that in which the order of accession or succession is inverted, interrupted, or otherwise disturbed; some of the stages being altogether suppressed, or at least masked by the lengthened and protracted duration of some one more of the others.

Similar paroxysms are alike in all the essential characters, whether of accession, regularity, irregularity, duration, or interval.

Dissimilar, are those which are unlike in one or more of the essential characters.

Interval.—The period which intervenes between the accession of preceding and of succeeding paroxysms.

Equal intervals, are those in which the intervening periods are equal.

Unequal,—Those in which the periods are unequal, being either longer or shorter.

[From Dr. Venables' Lecture introductory to a course on the theory and practice of physic.]

A BILL

(As amended by the Committee)

TO REGULATE THE OFFICE OF, AND THE MODE OF ELECTING,

COUNTY CORONERS.

1. WHEREAS the regulations for the elections of coroners for counties are insufficient: And whereas such elections are made with much riot and confusion, and are attended with great and unnecessary expense: And whereas for remedies of such grievances, it is expedient that an an alteration should be made in the manner of making such elections: And whereas the fees and allowances granted to coroners are inadequate to the trouble and expense attendant upon the execution of their office; Be it therefore enacted, by the King's most excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, That an Act passed in the 25th year of the reign of his late Majesty King George the

Second, intituled, "An Act for giving a proper reward to coroners for the due execution of their office, and for the amoval of coroners upon a lawful conviction, for certain misdemeanors," and also an Act passed in the 58th year of the reign of his late Majesty King George the Third, intituled "An Act to regulate the Elections of Coroners for Counties," shall, from and after the 31st day of December 1834, be repealed.

2. And be it enacted, That this Act shall commence and take effect on the 1st day of January 1835.

3. And be it enacted, that the justices of the peace assembled in their respective counties, ridings or divisions, shall, in some one of their general or adjourned quarter sessions which shall be holden after the passing of this Act and before the said 1st day of January, divide their respective counties, ridings or divisions into such convenient districts as to a majority of such justices in such sessions assembled shall seem best calculated to carry the purposes of this Act into effect, according to the number of coroners in each county, riding or division respectively, and with a due regard to the extent of the population, to the hazardous nature of the prevailing employments in the respective parts of such county, riding or division, and to the size of such districts; and that they shall also affix to each of such districts the name of some principal or convenient parish, township or place within the same.

4. And be it enacted, That the said justices so assembled as aforesaid, shall appoint one of the coroners of their respective counties, ridings or divisions, to be the coroner of and for each of the districts to be formed under the authority of this Act; and upon the death or removal of any such coroner so appointed as last aforesaid, his successor shall be elected to the office of county coroner, and exercise the said office according the provision of this Act: Provided always, That nothing in this Act contained shall extend or be construed to extend to affect the residence of any county coroner who shall have been elected previously to the passing of this Act, although such residence may not be within the district to which he may be appointed by virtue of this Act.

5. And be it enacted, That such justices so assembled as aforesaid shall order a list to be prepared by the clerk of the peace for their respective counties, ridings or divisions of the several parishes or hundreds, as the case may be, in each and every of the several districts into which the respective counties, ridings, or divisions shall be divided under the authority of this Act, and shall cause such order to be enrolled.

(*Clause A.*)*—6. And be it further enacted, That upon every inquisition which shall be duly taken in England and Wales by any coroner or coroners, in any township or place contributory to the county rates, directed by any statute now in force touching the assessing, levying and collecting county rates, such coroner or coroners shall be paid the sum of thirty shillings; and for every mile which such coroner or coroners shall be compelled to travel from the usual place of of his or their abode to take any inquisition, the further sum of one shilling and sixpence over and above the fees and allowances hereinbefore granted, shall be paid to him or them out of any monies arising from the rates before mentioned, by order of the justices of the peace in their general or quarter sessions assembled, for the county, riding or division where such inquisition shall have been taken, or the major part of them, which order the said justices so assembled, or the major part of them, are hereby authorized and directed to make, for which order no fee or reward shall be paid to the clerk of the peace or any other officer.

7. And be it enacted, That all coroners to be elected under the authority of this Act, shall be entitled to receive the abovementioned fees and charges for all inquests taken out of their respective districts for which they shall have been chosen to act as coroners, whenever such coroners shall have been duly called upon to hold such inquests, and shall have holden the same during the absence or illness of the coroner for the district in which such inquest shall have sat, or for other good and sufficient cause shown: Provided always, that no charges shall be allowed to any coroner acting under the authority of this Act, for any expenses of travelling for the purpose of acting as coroner within the district for which he shall have been elected to act, except for such number of miles as he shall have travelled within the same.

8. And be it enacted, That from and after the said 1st day of January, upon the death or removal of any coroner of any district formed under the authority of this Act, the election of a new coroner to such district shall be held at some place within the district in which he is to serve the office of coroner; and that every person to be so elected, shall be chosen by and only by a majority of such persons residing within such district as shall at the

* The Clauses marked *A*, *B*, *C*, *D*, *E*, *F*, *G*, *H*, *I*, were added in committee.

time of such election be duly qualified to vote at the election of knights of the shire for the county, riding or division wherein such district is situate.

9. And whereas great difficulty and delay are frequently occasioned by the non-attendance of jurors summoned to attend the coroner on taking an inquest, and there is no mode pointed out by law which compels the attendance of such jurors; Be it therefore enacted, That if any person having been duly summoned by any of the constables of the township, parish, or place in which such person shall reside, and returned by him to any coroner appointed or elected as aforesaid to serve as a juror in any county, riding or division in England or Wales, upon any coroner's inquest or inquiry before any such coroner, shall not, after being openly called three times, appear and serve as such juror on such inquest or inquiry, every such coroner is hereby authorized and empowed to impose such fine upon every person so making default as he shall think fit, not exceeding forty shillings; and every such coroner shall make out and sign a certificate, containing the christian and surname, the residence and trade or calling of every such person so making default, together with the amount of the fine imposed, and the cause of such fine, and shall transmit such certificate to the clerk of the peace for the county, riding, division or place in which such defaulter shall reside, on or before the 1st day of the quarter sessions next ensuing; and every such clerk of the peace is hereby required to copy the fine or fines so certified, on the roll on which all fines and forfeitures imposed at such quarter sessions shall be copied, and the same shall be estreated, levied and applied in like manner, and subject to the like powers, provisions and penalties in all respects as if such fine or fines had been part of the fines imposed at such quarter sessions, unless some reasonable excuse shall be verified upon oath or by affidavit, to the satisfaction of the magistrates assembled at such quarter sessions.

(*Clause B.*)—10. And whereas at the taking of inquisitions on the bodies of persons lying dead, it is frequently necessary, for the more satisfactory explanation of the cause of the death of such persons, that a post-mortem examination of such bodies, or of some part thereof, should be made by some surgeon or other person of the medical profession, and his evidence given on such examination: And whereas there is at present no remuneration provided for such surgeon or other person, whereby great difficulty exists in procuring such post-mortem examination to be made; Be it therefore enacted, That in every case where the assistance of any such surgeon or other person for the purpose of such post-mortem examination, and his evidence thereon, shall be thought necessary and required by the coroner and jury, the constable of the parish or place in which such inquest shall be held, shall, on the direction of the coroner, pay to every such person, if he shall require it, a reasonable fee (such fee in no case to exceed the sum of one pound), before he shall be called upon to give his evidence; and such sum so paid by the constable shall be re-imbursed to him out of the funds provided for the relief of the poor of such parish: Provided always, That such remuneration shall not be given to any such person where he shall be called upon only to give evidence as the medical attendant of such diseased person during his life-time or at the time of his death.

11. And be it enacted, That from and after the said 1st of January, upon every election to be made of any coroner or coroners for any county in England or Wales, the sheriff of the county where such election shall be made shall hold a special county court for the same election at some convenient place within the district for which the election of coroner shall take place, on some day to be by him appointed, which day shall not be less than seven days nor more than fourteen days after the receipt of the writ de coronatore eligendo; and in case the election be not then determined upon the view, with the consent of the electors there present, but that a poll shall be demanded for determination thereof, then the said sheriff, or in his absence his under-sheriff, shall adjourn the same court to nine of the clock in the forenoon of the next day but two, unless such next day but two shall be Saturday or Sunday, and then of the Monday following; and the sheriff, or in his absence the under-sheriff, with such others as shall be deputed by him, shall then and there proceed to take the said poll in some public place by the said sheriff or his under-sheriff as aforesaid in his absence, or others appointed for the taking thereof as aforesaid; and such polling shall continue for two days only, such days being successive days, that is to say, for seven hours on the first day of polling, and for eight hours on the last day of polling, and no pole shall be kept open later than four of the clock in the afternoon of the said last day.

12. And for the more due and orderly proceeding in the said poll; Be it enacted, That the said sheriff, or in his absence the under-sheriff, or such as he shall depute,

shall appoint such number of clerks as to him shall seem meet and convenient for the taking thereof, which clerks shall take the said poll in the presence of the said sheriff or his under-sheriff, or such as he shall depute; and before they begin to take the said poll, every clerk so appointed shall by the said sheriff or his under-sheriff, or such as he shall depute as aforesaid, be sworn truly and indifferently to take the same poll, and to set down the names of each elector, and the place of his residence, and for whom he shall poll, and to poll no elector who is not sworn, if required to be sworn by the candidates or either of them, and which oaths of the said clerks the said sheriff or his under-sheriff, or such as he shall depute, are hereby empowered to administer; and the sheriff, or in his absence his under-sheriff as aforesaid, shall appoint for each candidate such one person as shall be nominated to him by each candidate to be inspector of every clerk who shall be appointed for taking the poll; and every elector, before he is admitted to poll at the same election, shall, if required by the candidates, or any or either of them, first take the oath hereinafter mentioned, which oath the said sheriff by himself or his under-sheriff, or such sworn clerk by him appointed for taking the said poll as aforesaid, is hereby authorized to administer; *videlicit*, "You swear (*or, being one of the people called Quakers*, you solemnly affirm), That you reside in the parish of in the county of and that you are, to the best of your knowledge and belief, at this time fully qualified to vote at an election of a knight to serve in Parliament for this county of and that you have not been before polled at this election.—So help you God."

13. And be it further enacted, That in case any elector or other person taking the said oaths or affirmations hereby appointed to be taken by him as aforesaid, shall thereby commit wilful or corrupt perjury, and shall be thereof convicted, or if any person shall unlawfully or corruptly procure or suborn any freeholder or other person to take the said oath or affirmation, in order to be polled, whereby he shall commit such wilful and corrupt perjury, and shall be thereof convicted, he and they shall for every such offence incur such pains and penalties as are by law inflicted on persons guilty of perjury or subornation of perjury.

14. And be it further enacted, That all the reasonable costs, charges, and expenses, which the said sheriff or his under-sheriff or other deputy shall expend or be liable to in and about the providing of poll books, booths, and clerks (such clerk to be paid not exceeding one guinea each per diem), for the purpose of taking the poll at any such election, shall be borne, sustained, and paid by the several candidates at such elections, in equal proportions.

15. And be it enacted, That from and after the passing of this Act, in all cases in which any person shall be charged by any coroner's inquisition with the commission of any crime, and shall be subsequently put upon his trial, either on such inquisition or in pursuance of any bill of indictment found for the same, the coroner before whom such inquisition shall have been found shall be wholly incompetent to act professionally in prosecution or defence of such person for such crime, directly or indirectly; and that in all cases in which it shall appear to the judge before whom such person shall be tried, that any coroner shall have so acted contrary to the provision and intention of this act, such judge is hereby authorized and required to impose upon every coroner so offending such penalty, not exceeding fifty pounds, as the said judge shall in his discretion think fit; and that such coroner so deprived of being engaged or employed, and being compelled to attend the trial in such cases, shall be allowed for each day's attendance in such manner as if he was a witness in any other trial.

16. And be it enacted, That every inquest to be held before any coroner upon the body of any person, shall be held, and the evidence of the witnesses and the charge and direction of the coroner thereon, and the verdict of the jury, shall be delivered in, in open court: Provided nevertheless, that the jury, after such charge, and before the giving in of their verdict, may retire, if they think fit, to deliberate thereon in private, or may deliberate thereon in court, with closed doors, as may appear most expedient to the coroner before whom such inquisition shall have been taken.

(*Clause C.*)—17. And whereas it frequently happens that it is unknown in what county, city, liberty, or other division, persons lying dead have come by their death, and doubts arise as to the proper place in which the inquest on such bodies should sit; Be it therefore enacted, That it shall and may be lawful to and for any coroner (such coroner acting within his own jurisdiction within the meaning of this act) to take inquest on the body of any person who shall or may by law be subject to such inquest in any such county, riding, or division where such body shall or may be first found dead, notwithstanding such person did not die within such county, riding, or division: Provided always, that in the case of any body found dead and floating

in the sea, or any creek, river, or navigable canal, such person shall be considered as first found dead in the county, riding, or division, to the land of which it shall be first brought.

(*Clause D.*)—18. And be it further enacted, That no coroner to whom any benefit is given by this Act shall, by colour of his office, or upon any pretext whatsoever, take for his office doing in case of the death of any person, any fee or reward, other than the recompense by this Act limited and appointed, upon pain of being deemed guilty of extortion.

(*Clause E.*)—19. And be it further enacted, That if any coroner appointed or elected under this Act, or otherwise howsoever, shall, from and after the said first day of January be lawfully convicted of extortion or wilful neglect of his duty, or misdemeanor, in his office, it shall be lawful for the court before whom he shall be so convicted, to adjudge that he shall be amoved from his office; and thereupon if such coroner shall have been appointed or elected under the authority of this Act, a writ shall issue for the amoving him from his office, and electing another coroner in his stead, in such manner as writs for the amoval or discharge of coroners, and for electing coroners in their stead, are in any cases directed by any law now in force, or by the provisions of this Act; and if the coroner so convicted shall have been appointed or elected in any other manner than under the provisions of this Act, the person or persons entitled to the nomination or appointment or election of any such coroner, shall, upon notice of such judgment of amoval, nominate, appoint and elect another person to be coroner in his stead.

(*Clause* 5.)—20. And whereas in cases where the sheriff is a party, or otherwise disqualified to act, and in various other cases, writs and processes in civil actions and suits, and also extents and other process where the King is interested, are frequently directed to and executed by the coroner, in the place and stead of the sheriff, but the coroner is not in any such case allowed any fee or reward for the execution of any such writs, process or extents; be it therefore enacted, that in all cases where any writ, process or extent whatsoever shall be directed to and executed by any coroner or coroners in the place or stead of any sheriff or sheriffs, such coroner or coroners shall have and receive such and the same poundage fees or other compensation or reward for executing the same as the sheriff or sheriffs, if he or they had executed the same, would have been entitled to receive for so doing, and shall also have such and the same right to retain, and all other remedies for the recovery of the same as the sheriff or sheriffs would have had, in whose place and stead such coroner or coroners shall have been substituted: Provided always, That if the fees or compensation payable to the sheriffs shall at any time after the passing of this Act be increased by Act of Parliament or otherwise, that in every such case the coroner or coroners shall be entitled to such increased fees or compensation.

(*Clause G.*)—21. And that the punishment of offenders may be less frequently intercepted in consequence of technical niceties; Be it enacted, That no judgment upon any coroner's inquest, whether after verdict, or by confession, default or otherwise, shall be stayed or reversed for want of the averment of any matter unnecessary to be proved, nor for the omission of the words "with force of arms," or of the words "against the peace," nor for the insertion of the words "on their oath," instead of the words "on their oaths," nor for that any person or persons mentioned in the inquest is or are designated by a name of office or other descriptive appellation, instead of his her or their proper name or names, nor by reason of any difference in the spelling of the names of the jurors in the body of the inquisition and the names subscribed thereto, nor for that any juryman shall have set his mark thereto instead of signing his name, nor for that such mark is unattested, nor for that any juryman has signed his christian name by means of an initial only, nor for omitting to state the time at which the offence was committed, when time is not of the essence of the offence, nor for stating the time imperfectly, nor for stating the offence to have been committed on a day subsequent to the taking of the inquest, or on an impossible day, or on a day that never happened, nor for want of a proper or perfect venue where the inquest shall appear or purport to have been taken by a coroner of or for the county, city, liberty or division.

(*Clause H.*)—22. And be it enacted, That nothing in this Act contained shall extend to Scotland or Ireland.

(*Clause I.*)—23. Provided always, and be it further enacted, That no coroner of the King's household, and of the verge of the King's palaces, nor any coroner of the Admiralty, nor any coroner of the county palatine of Durham, nor any coroner of the city of London and borough of Southwark, or of any franchises belonging to the said city, nor any coroner of any city, borough, town, liberty, or franchise which is not contributory to the county rates or within which such rates have not been usually assessed, shall be entitled to any fee, re-

compense or benefit given to or provided for coroners by this Act; but that it shall and may be lawful for all such coroners as are last mentioned to have and receive all such fees, salaries, wages and allowances as they were entitled to by law before the making of this Act, or as shall be given or allowed to them by the person or persons by whom they have been or shall be appointed.

Clinique Médicale, ou Choix d'Observations recueillies à l'Hôpital de la Charité. Par G. Andral. Tome V. Maladies de l'Encéphale. Paris, 1833. 8vo. pp. 739.

This volume, long expected by the medical public, completes the "Clinique" of M. Andral, whose great talents and extensive power of observation have rendered him a distinguished personage at a period of life when most men are but commencing their career.

Without devoting unnecessary space to an eulogium on the well-known author, we shall proceed at once to analyse the principal facts which may be deduced from the rich contents of this new portion of his work, which is occupied exclusively by the subject of diseases of the brain, and which may be advantageously compared with the similar work of Dr. Abercrombie, whose volume forms one of the best medical treatises in the English language.

The fifth volume of the *Clinique Médicale* is divided into three books. The first treats of "diseases of the envelopes of the brain," and is subdivided into sections occupied by "diseases of the dura mater," and "diseases of the arachnoid and pia mater." The second book treats of "diseases of the brain," including cerebral congestions, hemorrhage of the brain, and ramollissement; hypertrophy and atrophy of the brain, with cancer of that organ. The third book is dedicated to "diseases of the cerebellum," which, of course, closely resemble those of the brain, and admit of a similar subdivision. Each book is composed of a set of observations of cases (all of them fatal ones), in which the symptoms, progress, and termination of the disease have been noted by M. Andral himself with the greatest fidelity and attention, and a detailed account of the morbid appearances after death is appended to each observation. At the end of each book we find a *resumé* of the facts observed, and an examination of them in connexion with the diagnosis, which is often so difficult to establish in diseases of the brain.

On *Lesions of the Dura Mater*, M. Andral has collected only two observations, neither of them worthy of any very particular notice; they were fibrous, or fibro-arteous tumours, growing from the internal surface of the dura mater, and producing the usual symptoms of compression, hemiplegia, &c. The cases illustrative of diseases of the cerebral membranes are twenty-six in number, and are arranged by the author into separate chapters, according as the part of the membrane affected was situated at the upper surface of the brain, its lower surface, or in the ventricles. We have then a long chapter on the morbid appearances which are discovered after death in the different membranes, and an extended examination of the disorders which take place in the functions exercised by the organs of nutrition and relation.

The following is a brief *resumé* of the morbid appearances found after death in the membranes lining the brain:—

The *dura mater* seems to be affected much less often than the other two membranes; the two examples selected by the author from the numerous cases which he has seen, were fibrous tumours of the same structure as the dura mater itself, and very analogous to the fibrous tumours so often growing in the uterus. In another case, M. Andral found a considerable ossification of that part of the dura mater which forms the falx, and remarks that calcareous deposits more frequently exist here than in any other portion of the membrane. The cellular tissue uniting the dura mater to the arachnoid, is also the seat of calcareous formations, a circumstance which confirms an observation already made by the author, that ossification of fibrous membranes more frequently takes place in the subjacent cellular tissue than in that of the membrane itself. In

one case only was pus observed between the arachnoid and dura mater, and the author has never found an effusion of serum between these two membranes.

Lesions of the Arachnoid.—These chiefly manifest themselves in altered secretions. We should never consider the arachnoid as having been the seat of a morbid secretion, unless the product be contained in the cavity of the membrane, a case which is much more rare than when the morbid product is found externally. The morbid secretions which have been thus observed are the following:—1st. An effusion of clear, transparent serum; this is rarely found on the upper surface of the brain; it is more common at the base, near the occipital fossæ. 2nd. An effusion of troubled serum mixed with purulent flocci; M. Andral has seen only one example of this in the cavity of the arachnoid. 3rd. False membranes, either organized or not organized, adhering to either surface of the arachnoid. The slightest vascular injection of the arachnoid has never been found to exist, with or without these different alterations of secretion, nor has the author observed it thickened or coloured. It has always appeared to him, that the seat of the disease existed in the cellular tissue, where the membrane at first view seemed altered in colour, or thickened. Instead of serum, the ventricles are sometimes filled with true pus in a greater or lesser quantity, and here, as in the former cases, the membrane almost invariably preserves its normal colour and consistency.

Lesions of the Pia Mater have been observed much more frequently; they are, 1st, Infiltration of its tissue by clear serum; 2nd, Infiltration of a milky-coloured serum, or even true pus; 3rd. A true scirrhous induration of the tissue of the pia mater; the author has seen one example of this rare affection; a layer of solid greyish-blue matter, nearly half an inch thick, was spread over the whole surface of the hemisphere; 4th. Serous cysts of divers magnitude; 5th. Cartilaginous or osseous plates; 6th. Tubercles, either disseminated or collected into masses on the surface of the pia mater, or on that part of the membrane which dips between the convolutions; in the latter case, unless we examine attentively, we might imagine that the tubercular matter was formed in the parenchyma of the brain itself; 7th. Adherences between one portion of the membrane and another.

In terminating the enumeration of lesions, the author takes occasion to make a remark which young anatomists would do well to bear in mind, viz., that the greater part of the morbid appearances which authors place in the arachnoid, and regard as the anatomical signs of arachnitis, most frequently exist in the pia mater. Thus, for example, in almost every case where the convexity of the hemispheres is covered by a layer of pus or serum, the morbid product exists *below* the arachnoid; and in passing the bulb of a scalpel over that membrane, we merely displace the fluid, but do not remove it.

In examining the different colorations and degrees of injection presented by the membranes of the brain, M. Andral has found their seat ninety-nine times in a hundred exclusively confined to the pia mater, while the arachnoid remained colourless and transparent above it. However, if we admit that, in diseases to which the name of *arachnitis* has been given by nosologists, anatomy more frequently discovers lesions of the pia mater, several of the observations detailed by the author prove that occasionally we find at least morbid products in the cavity of the serous membrane. All possible varieties of alteration in the membranes may exist, without the brain participating in the slightest degree. This was the case in the greater number of observations made at *La Charité*; but sometimes the gray substance of the convolutions was injected and softened, and changed into a kind of pulp.

From an examination of the morbid appearances, M. Andral passes to the consideration of the different functional disorders which accompany disease of the membranes of the brain, and reveal its existence at the bed-side of the patient. This is the most valuable part of the volume now before us, and merits attentive study. The numerous facts collected by M. Andral in his hospital practice, or derived from medical literature, in which his knowledge is most extensive, are ana-

lyzed with the utmost care, and applied to illustrate the diagnosis of those, in many instances, obscure affections, with the happiest results.

The symptoms of meningitis may be divided into two classes; 1st. Those which depend upon disordered function of the cerebro-spinal system; and, 2nd. Those which result from derangement of the nutritive organs. One of the most important symptoms in the history of meningitis, is *headach*. When we examine the observations reported in the volume before us, to determine the frequency of this symptom, we find, that in twenty-eight cases of affections of the cerebral membranes, sixteen were accompanied by headach; in twelve this symptom was not observed. If, again, we analyze the sixteen observations (for the particulars of which we must refer to the work itself), it follows that the pain which attends diseases of the cerebral membranes, may exist with affections of those membranes differing extremely from one another in nature and situation. A similar examination of the twelve cases in which no headach was observed, leads to the conclusion, that they differ in no respect either as to the locality of the disease, its intensity, or its nature, from those in which headach was one of the most prominent symptoms.

Such is the result of the author's personal experience; let us now consider the observations which he has collected from different writers on cerebral disease.

In the work of Du Châtelet and Martinet upon arachnitis, we find the history of sixty-two cases of acute inflammation of the cerebral membranes, free from all complication; in fifty of these, headach is mentioned as a prominent symptom. Dance has published an account of nineteen cases of acute affections of the meninges; fourteen were without complication, and we find headach noticed in twelve.

It is unnecessary to multiply citations upon this head; the facts already stated being sufficient to establish, that in a vast majority of cases, headach is a prominent symptom of acute and chronic affections of the cerebral membranes, and that it accompanies very different lesions, such as simple injections of their tissue, the formation of membranous concretions, purulent infiltration of the pia mater or brain, and, finally, a collection of serum in the cavity of the ventricles.

But an important point remains to be examined:—Is this headach a distinctive character of cerebral affections, or do we observe it in other diseases; for example, in acute inflammations of the digestive tube? Here let us again have recourse to an analysis of facts. A former volume of the *Clinique Médicale* contains an account of forty-five cases of inflammation of the digestive tube, and of these, twenty-one presented before death more or less headach. In fifty-eight observations collected by Louis, in his treatise upon typhus fever, the headach presented itself forty-four times; thus we see that headach occurs as a prominent symptom in other affections, and cannot establish in a general manner the existence of meningitis; we are, therefore, compelled to seek whether the headach may offer any distinctive characters which point out its connexion with inflammation of the cerebral membranes. As to its situation, there is some resemblance between the headach symptomatic of meningitis, and that which exists in continued fevers; but the *intensity* of the headach merits greater attention, and is considerably of more value as a distinctive sign. The pain of the head accompanying fever is in many cases of such a nature, as not to reveal itself until the attention of the physician or patient is particularly directed to that point. In most cases of meningitis, on the contrary, the pain is excessive, and the patient is the first to complain of the distressing nature of this symptom.

The modifications of this alteration of sensibility are various, but as they are noticed in detail in all works upon cerebral inflammation, we shall not recur to them here. Alterations of the cutaneous sensibility are much more rare, indeed we may say extremely so; only four cases have been observed by the author; in one of these the sensibility of the skin was exalted in an excessive degree; in the rest it became obtuse towards the end of the disease. M. Andral is inclined to regard this phenomenon as exceptional; not depending on

the disease, but on some particular disposition of the individual.

1. *Lesions of Sensibility.*—In diseases of the central organ of the nervous system, one would conclude, *a priori*, that the organs of sense are peculiarly affected, and many physicians still attach great importance to the modifications presented by the eye in cases of meningitis. Let us see how far the value of this symptom is supported by experience. As irregular movements of the globe of the eye, they are often observed in ataxic fevers, without any injury of the brain, but permanent strabismus seems to be a symptom of more importance. The state of the pupil is excessively various; many writers affirm that the pupil is contracted during the first period, and dilated and immoveable in the second, when effusion has taken place.

Experience does not confirm this remark, at least we can by no means establish it as a general rule. If we examine the fifteen cases related in the present volume, where the state of the pupils was noted, we shall in vain seek to connect any peculiar condition of the pupil with a peculiar affection of the brain; for example, permanent distention of the pupils does not necessarily prove effusion, either on the surface, or into the ventricles of the brain; this is well illustrated by the seventh case.

The organ of hearing is also affected either slightly, or in a very variable manner. There is only one example of deafness reported by M. Andral, and in that case the upper part of the hemisphere was the portion affected; on the whole, we may conclude, what at first sight may seem strange, that there is no one alteration of sensibility in individuals attacked with meningitis, which constantly exists, or is necessarily connected with the presence of any peculiar form of meningitis.

2. *Lesions of Motility.*—These occur more frequently than lesions of sensibility, but still they are very variable and inconstant. They manifest themselves generally in the form of convulsions, and the parts of the body most frequently attacked are, the globes of the eye, the eyelids, face, lips, and, finally, the limbs. Tonic spasm is also frequently observed; thus, in many cases of meningitis, the arm is strongly contracted; this is less frequently seen in the lower extremities. It is not rare also to observe a tetanic state of the muscles of the neck, &c. Again, instead of increased muscular action, we may have loss of power, constituting partial or general paralysis, exhibiting itself under a variety of forms; these we cannot pretend to describe; they are already detailed in every work on the diseases of the brain; but on analyzing the different observations of the author, with a view of discovering what morbid alterations coincide with lesions of motility, we are led to draw this singular conclusion, that similar morbid changes coincide with the most opposite disorders of motility during life; thus, in the greater number of cases we find the same morbid appearance, whether the patient was affected with convulsions or paralysis; thus, independently of the lesion which we discover after death, there is a modification of the brain, undiscoverable by the anatomist, but which varies in each individual, and is the real cause of all the functional disorders manifesting themselves in the course of cerebral disease. Such is the theory advanced by M. Andral to explain the diversity of symptoms produced by the same alteration of the membranes of the brain, and also those extraordinary cases in which motility is not in the least deranged, although we find after death marks of severe organic disease; thus, nine cases of those related by the author presented the same morbid changes—viz. injection of the membranes, and effusion of serum or pus in the ventricles, or on the surface of the brain, yet in no one case was the muscular system affected.

3. *Lesions of Intelligence.*—Though the symptoms offered by the sensitive and muscular systems are of little value in diseases of the brain, the state of the intellectual faculties furnishes data of a more certain character. This is easily established, by examining the cases reported by authors. In twenty-five observations, detailed by M. Andral, we find only one in which the intellect remained untouched; in fifty-four cases reported in the work of Parent and Martinet, we find only two of a similar nature; finally, the

intellectual faculties were more or less troubled in all the observations reported by Dance. Hence, alteration of the intelligence is a very constant symptom of acute meningitis. It may present itself in two forms, as delirium or coma. The delirium accompanying meningitis is seen in every variety, and in some cases even assumes that intermitting character which has been regarded as peculiarly attached to sympathetic irritation of the brain. From the universality of the symptoms, it follows as a necessary consequence that it may coincide with every variety of meningitis; this, in fact, is the case, and it remains for the physiologist to explain why a simple congestion of the pia mater, a slight infiltration of pus into its tissue, produces the most violent derangement of the intellect, while a more deep-seated alteration of the brain, for example, a vast ramollissement often exists without the least trouble of the intellectual faculties. Instead of delirium, an individual attacked by meningitis may present a state of coma more or less complete. Does this symptom, so different in appearance from the former, indicate a difference in the nature or seat of the disease? Experience answers no; the morbid changes are the same for both; hence the author concludes that the first effect of inflammation of the membranes is to determine an excitation giving rise to delirium; this may terminate in coma, as it generally does; or sometimes the excitation may be so slight, and of such short duration, that coma presents itself at once as the primitive symptom.

4. *Disorders of the Organs of Nutrition.*—It is of much importance to consider the state of the digestive tube, when we would establish a correct diagnosis of meningitis, for several individuals affected with cerebral disease present many morbid phenomena with regard to the digestive tubes, which exist much less frequently when the latter itself is the seat of an inflammation more or less intense. It is evidently a point of much practical importance to decide whether the trouble in the digestive organs is merely symptomatic, or whether it depends on a diseased condition of the tube, complicating the primary malady. In order to throw some light on the subject, let us analyse the cases reported in the present volume, as we have done in the preceding cases, and we obtain the following general conclusions. In all cases of death produced by meningitis, the tongue preserved its natural state during the whole course of the disease, whenever the digestive passages were found healthy, and never exhibited any anormal appearance, except in those cases where the autopsy showed the existence of disorders which we know to be accompanied by a remarkable change in the state of the tongue. Hence, whenever the tongue becomes dry, charged, &c., during a meningitis, our attention should at once be directed to the state of the digestive organs, as this condition should not be considered dependent on the cerebral affection. In many individuals, also, we find the epigastrium excessively tender on pressure, without the existence of an inflammatory condition of the stomach. Vomiting, or at least nausea, is a symptom which frequently accompanies meningitis at the onset of the disease, and, in many cases, it exists alone, without any other derangement of the primæ viæ. In this form it constitutes a most useful sign to distinguish at the commencement those nervous symptoms which depend on idiopathic irritation of the brain, from those which are connected with inflammation of the intestinal follicles, where vomiting is excessively rare.

5. *Lesions of the Circulation.*—The state of the pulse does not furnish any indications of importance in diseases of the cerebral membrane. In 79 cases the pulse presented the following modifications with respect to frequency:—Ordinary frequency, 18; accelerated, 33; ordinary frequency during the course of the disease, but accelerated towards the end, 16; less frequent than ordinary during the course of the disease, and accelerated near the end, 8; alternately quick and slow, 3. Thus we see that the state of the pulse is very variable in cases of meningitis; and also that the number of cases in which it preserves its ordinary frequency for a considerable time, is greater than the number in which it is accelerated. Inflammation of the cerebral membranes does not, therefore, occasion in all cases, or even in the majority, that

disturbance of the circulation which is so characteristic of inflammation in other parts of the body.

Diseases of the Brain—Congestions—Apoplexy.—From affections of the membranes we pass to diseases of the brain itself, and commence with cerebral congestions and apoplexy. This is a part of cerebral disease which has been studied with more success than any other, and is, consequently, more familiar to the practitioner; we shall, therefore, confine ourselves to a few interesting points, and endeavour to trace the connexion between the functional disorders produced, and the extent or seat of the effusion giving rise to them.

Paralysis is the most constant and characteristic symptom of cerebral hemorrhage; indeed, the slightest effusion of blood into the parenchyma of the cerebral hemispheres invariably produces more or less destruction of muscular power in some part of the body; the intensity of the paralysis is generally directly proportionate to the extent of the effusion, and the different situations in which the hemorrhage may take place, do not seem to have any influence appreciable in determining paralysis of one portion of the body more than another.

The paralysis may be general or partial; and it is curious to observe, that this general loss of muscular power is a much less sure sign of cerebral hemorrhage than paralysis of one-half of the body. Partial paralysis occurring suddenly is, on the contrary, one of the best signs of apoplexy. The only law we can establish with regard to its seat, is the well-known fact of its occupying the side of the body opposed to that of the cerebral hemisphere attacked; the exceptions to this law are very rare, and the phenomenon, as M. Andral observes, cannot be explained by the intercrossing of the fibres of the medulla oblongata, according to most pathologists, for that theory would embrace only cases in which the limbs merely were affected, without being applicable to paralysis of the face, and which constantly take place at the side opposite to the effusion, although its nerves are supplied from a portion of the brain above the decussation.

The doctrine of Gall, of localizing the intellectual powers, and assigning to each its seat in a peculiar part of the brain, has been lately applied by several pathologists to cases of effusion, and they have attempted to prove that paralysis of the upper extremities depends on a lesion of the optic thalamus, while paralysis of the lower extremities is connected with injury to the corpora striata or nervous matter beneath them. This is an enticing theory, and has been supported by some facts recently published. Let us examine facts on the other side. M. Andral has collected 75 cases, in which the lesion was perfectly limited to a small portion of the brain; of these, 40 presented paralysis of the upper and lower extremities of the same side of the body. What then were the lesions in these 40 cases? In 21 the anterior lobes or corpora striata were injured; in 19 the disease was seated in the posterior lobe or optic thalamus. Again, in these 75 cases we find 23 limited to the upper extremity, of which 11 presented lesion of the anterior lobe or corpus striatum; 10 of the posterior lobe or thalamus; and 1 of the middle lobe.

From these facts, it is impossible not to conclude, that in the present state of the science we cannot assign any distinct seat in the brain for motion of the upper or lower extremities. In some cases of paralysis accompanying hemorrhage, the patient recovers either imperfectly or completely the use of his limbs after a considerable lapse of time. We have not often opportunities of examining cases of this kind after death, but whenever such present themselves, we find some trace of an old hemorrhage, a serous cyst, perhaps, or a white line surrounded by a little indurated portion of the cerebral substance. Lesions of the sensibility are very numerous and varied in apoplexy. In many cases, before the attack, the sensibility of the skin becomes altered or diminished in various parts of the body; the mucous membranes also occasionally exhibit a similar phenomenon; the conjunctiva is insensible, as in an animal whose fifth pair of nerves has been divided; the membrane of the nostrils, of the mouth, &c., has also been found insensible. These facts seem to indicate that certain cases of cerebral

hemorrhage, no matter where it may be seated, exercise a modifying influence on the fifth pair of nerves. The lesions of intelligence, which precede or follow cerebral hemorrhage, are numerous, and in many cases they are accompanied with a loss of voice. M. Bouillaud published, some years ago, a curious memoir, in which he endeavoured to locate this loss of voice, concluding that it depended on lesion of the anterior extremity of each hemisphere; but this theory is not entirely supported by fact. M. Andral has collected fourteen cases of loss of voice, without any lesion whatever of the anterior lobes; besides, Lallemand quotes a case where the injury was confined to the cerebellum.

Ramollissement of the Cerebral Hemispheres.—Ramollissement of the brain is an affection to which, within the last few years, the attention of pathologists has been particularly directed by the works of Rostan, Lallemand, Bouillaud, and others; but much still remained to be done, and we can compliment M. Andral on having contributed not a little to clear up certain difficult points connected with this subject, by the careful method of his indications, and the rigorous manner in which he has ascended from particular facts to general conclusions. In this section of his work, M. Andral details thirty-three cases of ramollissement of the brain, presenting every variety of symptom and anatomical appearance, the study of which will at once convince the reader how difficult it is to establish, in many instances, a correct diagnosis of this most obscure affection. Each part seems to have its own peculiar physiognomy, and to possess little or nothing in common with the others; or similar symptoms are so interwoven and mixed up as to give to the same identical anatomic lesion various morbid forms of the most distant nature one from the other. Thus, in one case, from the symptoms, we should call the disease apoplexy; in another, it assumes the form of ataxic fever; in other cases it is characterized by a gradual loss of motion, or of motion and intelligence together; or, finally, ramollissement may exist without any symptom announcing the slightest lesion of the centre of the nervous system.

With such a diversity of characters, it is not easy to arrive at fixed principles; however, we shall attempt, with the author, to seize the points of resemblance or difference between the cases reported, and to draw thence some general consequences. In the first place, if we examine the anatomical character of ramollissement of the brain, we shall soon find that it presents several varieties, some of them so different from each other, as almost to indicate a difference in the nature of the lesion. Sometimes the only change observed is a simple diminution of consistence; a portion of the brain seems to have returned to its fœtal state, retaining however its normal colour. In other cases the softened part exhibits a remarkable paleness; all its vessels have disappeared, and it does not contain a drop of blood; this is peculiarly seen in softening of the gray matter, which, under such circumstances, can no longer be distinguished from the medullary substance. Lallemand regards this decoloration as the product of purulent infiltration; but when the softened parts contain pus, they present quite a different aspect.

Here, then, we may establish two distinct anatomical varieties. In the first, ramollissement constitutes the sole morbid element; in the second, it is united to a state of anemia, exactly the reverse of inflammation. Again, ramollissement may be attended with an inflammatory state, an occurrence much more rare, according to M. Andral, than is usually supposed; or the softened substance may contain pus or serum. Are these various morbid appearances dependent on lesions of a different nature; or are they not, rather, different degrees of the same affection? Lallemand has proved, that in a great number of cases the brain at first becomes injected, is then softened, and, finally, secretes pus; here, undoubtedly, the ramollissement is the effect of inflammation; but what right have we to suppose the existence of inflammation in cases where we find no trace of injection or purulent deposit? This would be following a false analogy; besides, many cases of white ramollissement are formed very rapidly, and we

cannot there suppose that the softening commenced by a congestive state, which was dissipated when the disease became chronic. The phenomena of ramollissement cannot, therefore, be attributed solely to inflammation, and M. Andral equally rejects the opinion of Cruveilhier, who has named the disease "capillary apoplexy." If, in several cases, we find marks of sanguineous infiltration, in others we do not meet with the least trace of capillary injection.

It is a matter of some importance to decide in what condition we find the different organs in individuals who have fallen victims to ramollissement of the brain. From the researches of M. Andral it would appear, that one organ only receives any direct modification from the cerebral disease; the lungs, in a great number of cases, have been the seat of considerable serous congestion, and the patients have died in a state of asphyxia, giving rise to the capillary injection so remarkable in the vessels of the digestive tube. The middle and anterior lobes, with the corpora striata, are the portions of the brain most frequently affected with ramollissement, and it has been said that the gray substance is more frequently affected than the white; the disease may exist either in a single point of the brain, or comprise the two hemispheres in their whole extent, and it has been equally observed in every period of life, from the new-born infant to the man of ninety years of age.

From the anatomical characters let us pass to a more interesting part of the subject, viz., the symptoms which declare the existence of ramollissement.

The intellectual faculties, motion and sensation, are modified in different degrees by softening of the brain. The changes which the intellectual faculties undergo are various; sometimes the mind is not troubled in the least; sometimes they are annihilated at the very commencement of the disease, or they may exhibit a state of weakness and stupor similar to that seen in typhus fever; or, finally, the patient may be affected with delirium.

If we examine the morbid appearances exhibited after death by individuals who during life presented these different modifications of intellect, we shall be forced to draw this remarkable conclusion, "that the state of the meninges and brain is the same in cases where the intellectual faculties have been lost or disturbed, as in those where no trouble of the intellect has existed, and hence we may deduce a law, applicable to other diseases, as well as to those of the brain, that the variety of symptoms furnished by a disease, cannot in many cases be explained by the different morbid conditions in which we find the diseased organ, in the same manner as we are unable to explain the different modifications of the same function, in different individuals, by any anatomical peculiarity in the organ where it is seated."

The symptoms of ramollissement derived from changes in the muscular power consist either in simple paralysis, contraction of the limbs, or convulsions. These different modifications may come on slowly or suddenly, at the commencement or during the course of the disease, and when sudden contraction of a limb accompanies symptoms of cerebral disorder, it becomes a precious sign for the diagnosis of ramollissement. The sensibility is sometimes also changed in a remarkable degree, being either diminished or exalted. Diminution or destruction of sensibility is generally found in the part of the skin which covers the paralysed member. In a considerable number of cases, also, the cutaneous sensibility of the paralysed limb is so exalted, that the slightest touch will bring on convulsive motion of the tendons. The organs of sense, if we except the occurrence of coma, have remained untouched in almost all the cases of ramollissement published by M. Andral. Finally, if we look to the state of the digestive organs, we find little trace of disorder; the tongue preserves its natural appearance; vomiting rarely accompanies the onset of the disease, and the abdomen is indolent.

As to disturbance of the circulation, the remark already made in reference to meningitis, is equally applicable to ramollissement of the brain; the pulse is found to preserve its ordinary frequency as often as it is accelerated; a circumstance which we are forced to explain by individual dispositions, for we may have acce-

lerated an ordinary pulse in cases otherwise identical. The respiration is very often altered by ramollissement of the brain; when the attack is acute and sudden, it becomes stertorous, as in cases of apoplexy; when, on the contrary, the ramollissement is chronic, the respiration is not at first affected, but becomes irregular and laborious by degrees, and a species of asphyxia is gradually established, which finally carries off the patient. In other cases a very remarkable phenomenon takes places; the respiration remains unaltered for several days, and then, on a sudden, without any known cause, becomes accelerated and difficult, and the patient quickly dies in a state of asphyxia. Here the lesion of the nervous system suddenly exercises a fatal influence on the respiratory organs, which they had not before felt, but neither the pathologist nor the anatomist can devise the nature of that sudden change.

Let us now endeavour to group together the different symptoms already noticed, and derive from their consideration some general idea of the symptomatology of this disease. Ramollissement of the cerebral hemispheres may, in some cases, be preceded by premonitory symptoms. These consist, either in the different phenomena belonging to cerebral congestion, in a simple headach, or in some slight alteration of sensation or motion, as weakness of a limb, &c. It may exist either as an acute or as a chronic disease; in the latter case we observe the following symptoms: the patient is often affected with headach, and at the same time perceives that one or two extremities on one side of the body are more feeble than those on the other; they feel numbed or painful, and the feebleness soon passes into paralysis or contraction. In most cases also the intellect becomes dull towards the end of the disease; by degrees the cerebral affection influences the functions of organic life; the respiration becomes laborious, nutrition is intercepted, and the patient dies either in a state of asphyxia or adynamia, or by the supervention of some internal inflammation, characterized by weakness. At other times the disease remains chronic for a greater or lesser period, and then suddenly assumes the acute form. This may depend either on the seizure of the membranes by inflammation, or on the occurrence of a second ramollissement or cerebral hemorrhage.

In cases of acute ramollissement the symptoms are by no means always identical, but if we assemble the different leading points of the observations detailed in the present work, we may refer this variety to two principal forms. In one, softening of the brain bears a strong resemblance, from the functional disorders it produces, to apoplexy; in the other, it gives rise to symptoms which commonly characterize inflammation of the cerebral membrane. In the first form motion is suddenly altered to a high degree on one or both sides of the body, but the intelligence remains often untouched, and sensibility is rarely altered, or the patient suddenly falls into a state of coma, as in cases of apoplexy, from which he never recovers. At other times the coma goes off, but the intelligence remains injured in different degrees until the death of the patient. In the second form ramollissement bears the strongest resemblance to meningitis.

Let us take the three last cases given by M. Andral. After premonitory symptoms, chiefly marked by headach, these patients were suddenly seized with delirium, which either persisted or terminated in coma. These symptoms were accompanied by a convulsive movement of the muscles, subsultus tendinum, &c. Here we have nothing as yet to characterize ramollissement. But the disorder of the muscular system is soon aggravated, and determined especially to one side of the body. We rarely observe simple paralysis, but much more frequently contraction of the limbs. The several symptoms increase, and the patient soon dies, either in a state of excitement or coma.

Thus the principal symptoms revealing the existence of ramollissement simulate, in a very close manner, sometimes an accidental production in the brain, sometimes apoplexy, sometimes acute meningitis; but if this resemblance be so strong in some cases as to prevent a distinction, in the majority, ramollissement offers symptoms which do not permit us to confound it with any other affection.

It is now time to arrive at the therapeutic considerations connected with ramollissement. Were the disease proved to be of an inflammatory origin in all cases, the treatment would be simple enough; but an examination of facts does not permit us to adopt that theory, and in many instances it is almost impossible to pronounce a decided opinion on the nature of the affection,—to distinguish, for example, certain forms of ramollissement from apoplexy or meningitis.

What, then, is the physician to do in the midst of such uncertainty? Here, as in many other circumstances, the curative indications are less furnished by the nature of the disease than by its symptoms and the general state of the economy. Thus, for example, if a supposed ramollissement of the brain be accompanied by symptoms of cerebral congestion, a strong pulse, &c, we must have recourse to blood-letting, which is also indicated by violent delirium, convulsions, contractions of the limbs, and other symptoms of agitation of the nervous system; but in the latter cases we must proceed with caution, for M. Andral has frequently remarked, that abundant blood-letting has, under such circumstances, aggravated the cerebral accident, and thrown the patient into a state of weakness soon terminating in death. In cases where the ramollissement is not accompanied by signs of cerebral congestion (and these cases are numerous), where there is no development of the pulse, and where the disease has commenced by a gradual diminution of motion and sensation, blood-letting is rather injurious, and should give place to the application of leeches; at the same time we may administer internally some mild tonics, preparations of bark or iron.

Hypertrophy of the Brain.—We shall now terminate our analysis of the present volume by a few brief remarks on this affection, a disease very rare, and which has not yet attracted much attention on the part of medical men. Indeed, Bouillaud and Dance are the only authors who have published observations upon it.

Hypertrophy of the brain should be distinguished from an augmentation of volume resulting from hyperemia; and this is the more easily done, as all cases of hypertrophy are accompanied by a remarkable paleness of the organ; indeed the affection does not seem to be produced by determination of blood to the part, as theory would lead us to believe. While the substance of the brain becomes enlarged by excess of nutrition, the cavity of the skull may remain unchanged, as is most frequently the case, or may be developed at the same time with the contained organ. After death we find the brain in the following state. As soon as the dura mater is divided, a portion of the brain projects through the incised part, at once indicating some abnormal degree of development. The membranes themselves are usually healthy, but on examining the surface of the hemispheres, we are struck by its remarkable appearance. The spaces which ordinarily separate the convolutions have disappeared; the latter are pressed, and, as it were, glued together; the ventricles are also pressed upon each other, and the nervous substance is changed both in colour and consistence; the substance of the brain is nearly bloodless. When divided by the knife, we do not find a trace of blood. The gray matter, both on the surface and in the interior of the brain, has lost its colour, and can with difficulty be distinguished from the subjacent medullary substance. Finally, the pulse of the hemispheres is either more consistent than natural, or has acquired a density in some cases amounting to that of the white of a hard-boiled egg. Such are the anatomical characters of the disease.

The symptoms by which it is accompanied arrange themselves into two groups; 1st. Those indicating a chronic period, and, 2nd. Those which reveal the existence of an acute stage. During the first period the chief symptoms we remark are, various derangements of the intellect, headach, convulsions, and, finally, epileptic fits, more or less frequent. When this stage has continued for some time, a different set of symptoms appears: some patients are suddenly attacked and cut off by strong convulsions, while others present the signs of cerebral compression or acute hydrocephalus. Finally, some individuals die suddenly, without our ever being able to assign any precise cause.

Hypertrophy of the brain naturally leads to a consideration of atrophy, from which the author passes to cancer. The views adopted by M. Andral on the latter affection, are deduced from an analysis of forty-three cases collected by himself or detailed in standard works.

The length of our present notice does not permit us to follow up this part of the subject; we shall, therefore, conclude by referring our readers to the *Clinique Médicale* itself, which we strongly recommend to the attention of every practical medical man.

THE LANCET.

London, Saturday, June 21, 1834.

A COUNTY CORONER'S Bill has passed the House of Commons, and has been read a first time in the House of Lords; but *the* Bill which was introduced into the House of Commons by the Honourable Member for CIRENCESTER has *not* been adopted by any portion of the Legislature. On the contrary, the two measures which have been recently before the House are nearly as dissimilar as light and darkness. A copy of the Bill, which has been read a third time in the Commons, and a first time in the Lords, will be found at page 451 of the present number of our Journal. The first Bill consisted of fifteen clauses; the measure now in progress contains twenty-three clauses, all those from A to I having been added by the Committee.

The Bill, be it observed, is brought forward with a view to remedy some alleged existing defects with respect to the mode of electing Coroners for counties, and this appears to have been the only object which the proposer of the measure had first in view. New subjects, however, arose in the discussion, and the feeling of the House has conformed in some respect to some intimations which have been given beyond the walls of the House of Commons. But, notwithstanding the clippings, changes, and numerous additions which the Bill has received, is it entitled to the favourable opinion of the public, or to the support of the medical profession? Assuredly not; for it is even now a crude, undigested, ill-arranged measure, utterly devoid of the great principles on which a law relating to Coroners should be founded.

In the first place it will be observed by persons who are acquainted with the present state of the law, that it will prove an instrument of disfranchisement to an enormous extent, by cutting off the elective rights of those individuals whose freehold possessions are of less value than forty shillings annually,—by depriving the electors of the privilege of voting for *all* the Coroners of the county, and limiting it to the one Coroner of the district in which the franchise is to be exercised, and by rendering the inhabitants even of *that* district subject, in exercising their right of franchise, to the operation of the disqualifying rate-and-tax-payment clause of the Reform Act. The extent to which the franchise will be cut down by this last provision alone may in some measure be conceived, when we remind our readers that, in the late contest for the coronership of MIDDLESEX, seven thousand two hundred persons having freehold rights, *recorded* their votes at the poll, whereas the number of freeholders and occupiers of the county, registered as entitled to vote for Members of the county, does not amount to six thousand —that is, the number of registered voters is under six thousand, whereas the number of freehold voters who actually voted amounted to seven thousand two hundred, whilst at that election it was estimated by competent judges that upwards of four thousand electors remained unpolled. The

injustice, therefore, which is contemplated by the proposed measure is of a very striking character, and it indicates that in what is called a "popular" assembly there is no very warm or deeply-rooted feeling in favour of popular rights. Had it been proposed to deprive some half-dozen rich nabobs of *their* rights, the bare suggestion would have produced more excitement and discussion in the House of Commons than has the actual passing of a bill which deprives not less than six thousand individuals of the right of electing the two coroners for the county.

We ought not, indeed, to speak of the discussion so elicited as comparative, because the disfranchisement portion of the Bill, which has just been read a third time in the House of Commons, elicited no discussion at all in that assembly. It was thought, we presume, unworthy of argument or consideration. But when it is recollected in how great a degree the welfare of the community is sometimes sacrificed through the duplicity or ignorance of the Coroners, certainly the right to elect those officers ought not to be considered as a privilege of minor importance. Circumstances connected with some recent inquests establish this point so clearly, that to prove it to the most common-place capacity, it is not necessary that we should resort to the convincing powers of argument.

In the Bill now before the Lords, it is proposed to increase the official remuneration of Coroners by one moiety—that is, the inquest fee is to be increased from twenty shillings to thirty shillings, and the allowance for travelling expenses from ninepence to eighteenpence a mile. But what provision is made for the remuneration of *medical witnesses*—for those gentlemen whose education is purchased at a cost of thousands of pounds, and a knowledge of whose profession cannot be acquired except through years of laborious research and patient study—and who, besides, while they are collecting that information which in its application confers so much advantage on their fellow-creatures, are compelled, from the very nature of their pursuits, to behold, under every form and variety, the most dreadful maladies which disorganize the human body, and often, ultimately, expel the human mind from its tenement? What provision, we repeat, is made in favour of medical witnesses? How are *their* expenses to be paid? How are they to be rewarded for their attendance? Why they are not thought of, except to be insulted by a disgusting proposal that the Coroner may order them a payment of *twenty shillings* for making a scientific examination of the dead human body. Surgeons and physicians, in the ordinary course of their practice, are entitled to a guinea for applying their fingers once to the pulse of a delicate wrist, although here, when called to perform a duty, the discharge of which is often disagreeable, and not unfrequently loathsome—a duty which, for its adequate accomplishment, demands a most accurate knowledge of the structure of the human body—a duty which is so often attended with extreme danger to the dissector, that it is deemed a hazardous pursuit, and is charged as such by many of our insurance offices—for the execution of this duty, and *such* a duty, the Coroner *may* award the surgeon the noble payment of forty sixpences, and that officer cannot legally enforce the payment of a higher fee!

We call upon the profession, in the name of justice—in the name of professional honour and dignity—to spurn the menial stipend, and to refuse to institute a *post-mortem* examination unless they receive a guarantee that a tolerable remuneration will be made for their services. In some cases the twenty shillings may be deemed an adequate payment, but in

others, where the cause of death is obscure, and all the important organs of the body require to be diligently and scientifically examined—a duty which cannot be executed in less than an hour or two, so that the body be restored to a condition suited to the inspection of distressed relatives,—three times that amount would not probably be a just remuneration for the time, labour, and talent, devoted to such an occupation.

As the voice of the profession has not in this case succeeded in obtaining even a partial recognition of medical privileges in the Commons, it is the duty of those practitioners in medicine, who, in the execution of their professional labours, are in the habit of encountering the noblemen belonging to the House of Peers, to explain the injustice towards the profession which is contemplated by this measure, and to urge not only that the Coroner may be empowered by law to make a higher rate of pay than twenty shillings for the performance of post-mortem examinations, but that he may also be empowered by law to remunerate medical witnesses for the time which they are now called upon to sacrifice in attending courts of inquisition. The Bill will doubtless be read a second time in the course of a few days. Not a moment therefore should be lost. If only one public-spirited Peer can be found to bring forward the propositions just mentioned, we believe there are no members of the Upper House who would be undignified enough,—nay, mean or unjust enough,—to attempt their rejection. Certainly, the Bill, if enacted into a law, may not continue in force many years, or it may be partially repealed, or amended, by a GENERAL MEDICAL ACT, which it is hoped and expected will be one of the results of another session of Parliament; but the supposition of the passing of an *unobjectionable* bill with respect to medical practice and government, presumes a state of things in the House of Commons far different from what can be said to exist in that assembly at the present moment.

THE surgeons of the *Bristol Infirmary*, in the *Memorial* which they presented to the Committee of the House of Commons, objected, and with great propriety, to that regulation of the College of Surgeons, which enjoins a six months' attendance—or, rather, the *payment* for such an attendance—at one of the "recognised hospitals" of *London*. The surgeons of the *Birmingham* Hospital, it is said,—for we have not seen their statement,—dissent from the opinion put forth by their brethren of Bristol, and approve of the principle of the six-months' regulation issued by the College. In order to mark out a "medium," and to produce an adjustment of these "conflicting opinions," the very ingenious surgeons of the *Winchester* Hospital propose,—in a manifesto just issued by them,—that the students should be examined on their arrival in town, by a Board appointed for the purpose, and be placed in *classes*, "by which plan the number of lectures, and the length of their future hospital attendance in London, might be *graduated* previous to their presenting themselves for final examination at the Hall or College."

The wisdom of this latter proposal is redolent of the known ability of the proposers. It is a "medium between the conflicting opinions" with a vengeance! The memorialists of Bristol urge the non-necessity of residence in London, and adduce strong arguments against such a residence, even if in any respect desirable. According to the present regulation, the most advanced, and the most ill-informed, of the students from the provincial hospital, have the same quantum of residence in the metropolis demanded from them.

This in itself is absurd and unjust, and the surgeons of the western metropolis have sought nothing but the meed of justice and sound policy, in demanding that gentlemen who have regularly pursued the study of disease in the infirmary of that city shall be entitled to an examination for their diploma without *any* attendance upon the *London* hospital practice. This demand, we repeat, is founded on one of the principles of medical reform, and, despite the interested opposition and narrow-minded policy of the corruptionists, the time is not far distant when the *cause* of a proposition so just and rational will have disappeared from the long catalogue of errors in medical government.

The following may be regarded as the manifesto of the surgeons of the *Winchester Hospital*, and we take this opportunity of inquiring if any of our correspondents can favour us with that of the enlightened officers of the *Birmingham Infirmary*:—

COUNTY HOSPITAL, WINCHESTER.

We have received a copy of the proposed memorial to which the surgeons of the Bristol Infirmary invite our assent, and also the strictures of the Birmingham Hospital surgeons thereupon; and we beg to state, that while we agree that there is much justice in many of the objections of the former, as to the little credit given to the provincial hospitals as schools of medicine and surgery, we must still allow that there is great truth in the remarks of the latter, especially in those which are opposed to the idea, that a residence in London might be altogether dispensed with.

As a medium between these conflicting opinions, we beg, very respectfully, to hazard a proposition for the consideration of both the above parties, as well as the profession at large, and also the Parliamentary Committee now sitting, viz.:—

That the interests both of schools and pupils, whether provincial or metropolitan, would be greatly promoted by the classification of the said pupils; for which purpose it would be desirable that a board should be established, at which each pupil on his arrival in town, or on his first entering any of the larger recognised schools, might offer himself for examination in materia medica, pharmacy, botany, chemistry, anatomy, physiology, medicine, and surgery; and in proportion to his proficiency may be placed in a 1st, 2nd, or 3rd class; by which plan the number of lectures and the length of his future hospital attendance in London might be graduated, previous to his presenting himself for final examination at the Hall or College.

By such means we are of opinion that the meritorious and industrious apprentice would be encouraged to obviate the third objection of the Bristol memorialists, and would have an opportunity of distinguishing himself in the commencement of his career, and thus due credit would be reflected on the master, or the elementary school from whence he came. From this source, also, we should consider the certificate of good moral conduct to be still an essential preliminary to examination.

Charles Mayo,
Henry G. Lyford,
W. J. Wickham, Surgeons.
May 31st, 1834.

DUBLIN COLLEGE OF SURGEONS.

(*From our private Correspondent.*)

The four gentlemen appointed by the Irish College of Surgeons to state the case of that College before the Parliamentary Committee are, Mr. Cusack, Mr. Kirby, Mr. Reid, and Mr. Tagart.

Mr. Cusack's claims to precedence on an occasion of this kind are undoubted. In that system, the full investigation of which is one of the determined objects of the medical Committee of the House of Commons, Mr. Cusack has laboured assiduously to hold a first place. Having so successfully contributed to its ignominious career, it is due to his persevering exertions that he should stand first on the list of faithful but fatal friends, by whose testimony the beloved but betrayed system itself must soon expire. It has been said, and with seeming truth, that *the man* is *the child*, a little advanced in life. We can often, indeed, trace in the adult, through the folds of the *toga virilis*, those lineaments of character which were wont to amuse us in the boy. Mr. Cusack was

a tory in his teens. We have been assured by a quondam companion of Mr. CUSACK, that at school he was silent, sullen, and selfish; and that in the little community to which he belonged, he was known by the name of the "churl," an appellation which significantly expresses the qualities of his maturer years. On receiving those acceptable presents which are sometimes made by fond friends to schoolboys, he informs us that the juvenile monopolist was in the habit of retiring to some place of secrecy to devour his *bonne bouche*, or to hide for future enjoyment what he was unable to consume. Hence "JEMMY CUSACK's" satchel, that beautiful emblem of toryism, became no less celebrated among his playfellows for the suavity and solidity of its contents, than it did for the frequency of the attempts made by his less provident contemporaries to rifle it of its precious stores. We have not the slightest doubt, indeed, but that it was by the exercitations of his natural talent for exclusive indulgence, on occasions of this kind, to guard against any division of his enjoyments with his playmates, that he acquired that dexterity in securing to himself in after life, every good thing within his reach, to the total exclusion of the other members of the College of Surgeons.

The next step in Mr. CUSACK's progress is not less distinguished for his attention to his own interests. In Trinity College, to which he was removed, he saw the great advantage of being an *incumbent* rather than a *supporter* of the establishment; and after having made himself master of a sufficiency of Greek and Latin for the purpose, he obtained a scholarship in the institution, and was, of course, a free denizen of its courts. How delightful must it have been to one of his prudent habits and circumscribed instincts to feel himself for the first time in the agreeable situation of a pensioner of the state!

But we have not time to dwell on his rapturous emotions on this occasion, or to point out the influence which the comfortable feeling of exemption from expense may have had in directing his mind on similar expedients in after life. We are rescued, indeed, from conjecture on this topic, by turning to the next circumstance in his career, his apprenticeship to the late Mr. OBRE of Granby-row, one of those crafty and cunning old men who was, of all others, best calculated to supply, by his own example, as well as by precept, any deficiency he might observe in the previous education and disposition of so congenial a pupil. The joint exertions of talents and of temperaments so well consorted, should have led to something eventful. Nor shall we be at all disappointed in the next leaf that we turn over in Mr. CUSACK's instructive history. Having served his apprenticeship, and undergone the process of "grinding" in the Peter-street mill, (who would have supposed that one of his own pupils would have played Mr. KIRBY such an ungrateful trick as that of destroying the "mill," and putting the "miller" himself out of the professorship of surgery?) he became a licentiate of the College of Surgeons; took the M. D.-ship of the University of Edinburgh, and went back to his native country, prepared for turning to account whatever opportunity of advancing his views, accident, his own exertions, or his political connexions, might create.

Such an opportunity was not long wanting. Mr. COLLES having introduced himself sufficiently into notice by his residence as surgeon in *Stevens' Hospital*, resigned that situation; and the only person who had a fair claim (we are speaking according to the principles of the parties themselves) to fill this important office, was a Mr. FRANCIS WHITE (the poor-law gentleman), senior apprentice to Mr. COLLES, and who had spent five years in doing the minor duties of surgeon to the hospital. Unfortunately for Mr. WHITE, he did not exhibit that shade of religion which had favour in the eyes of the governors of the hospital. Mr. WHITE was a Roman Catholic, and the governors passed a resolution that he was ineligible. Mr. CUSACK was a Protestant, and the governors wrote for him to accept the situation, and on the strength alone of the thirty-nine articles he was duly elected.

To these facts the especial attention of the Medical Committee of the House of Commons is called, and inquiry into their truth is challenged. They are briefly pointed out as instances of the baneful

influence which the ascendancy of one religion over another has exercised on the fate of professional men in Ireland. The *clerè*, however, was worthy of such patronage; in his recommendations to infirmaries, jails, and dispensaries, he has paid back with manifold interest the favour conferred on him by the advocates of exclusion from purely scientific offices on religious grounds.

But to turn from a topic which can be referred to only with loathing and reluctance. Mr. CUSACK's appointment gave a prematurity to his prospects, which, but for this genial sprinkling of the waters of Irish bigotry, might have found a protracted consummation in some obscure medical situation in one of the towns or villages in the provinces. It is more, however, to the present purpose to calculate how much the *gratuitous surgeoncy* to *Stevens' Hospital* is worth, or has been worth, to Mr. CUSACK, than to speculate on what his fate might have been without this reward for his happening to belong to a particular sect. In the first place it afforded him an opportunity of learning his profession, and placed him immediately before the public as a practitioner; Secondly, there are a great many apartments in the hospital unoccupied by patients, all of which Mr. CUSACK turns to account by letting them out for apprentice-fees to his extern pupils. This *hotellerie* for stray youths from the country has told well for Mr. CUSACK. He has seldom less than forty of them together, each of them paying him a fee of one hundred and fifty guineas, so that the "Doctor's" income from this source alone may be fairly estimated at fifteen hundred pounds a year. To this sum may be justly added five hundred pounds, received in private practice from this connexion, so that the *gratuitous* surgeoncy to Stevens' Hospital may be safely set down as worth two thousand per annum. What a splendid perspective for Master WILLIAM COLLES, the present heir of these magic apartments, which surpass in wonder the chambers of Bluebeard himself! and what a powerful incentive to Mr. CUSACK to exert all his powers in mystifying the Committee touching these naughty points! Why, it is enough to drive poor CAMPBELL mad; to break the heart of poor FLEMING—aye! or to transmute the sycophancy of any of the veriest slaves of Mr. CUSACK and Mr. COLLES into sadness and despondency, to think that these beautiful chambers have for ever vanished from their view, and into the possession, too, of one their junior, at least in professional standing. But these gentlemen still carry the satchel, and never think of dividing with their friends.

In the affairs of the College, Mr. CUSACK's talents for tact and intrigue have maintained a fatal ascendancy over the councils of that body. It would be difficult to cite an illegal perversion of the corporate power of the College to which he has not contributed the mite of his mischievous influence and ability. In this statement no disparagement is meant of Mr. JACOB's talents for similar exploits, or of the *clique* with whom he acts. Mr. CUSACK is the engineer-in-chief — the master-mind who can undermine the miners themselves, and with the aid of his "myrmidons" from Park-street (whose votes he can command at any time, and on any question, for a supper of oysters), he is enabled to carry any job in the College on which he sets his mind. The better to secure the attainment of such designs, Mr. CUSACK is every man's "friend;" and his maxim is to be always "one of the present company." In the society of Catholics he is usually an "O'Connellite;" and he spares no pains to gain the friendship of their priests, with some of whom he is a great favourite. He once so far imposed on the simplicity of the late parish priest of James-street, as to induce him to accept of Mr. CUSACK's carriage to take (as the "doctor" styled it) "an airing;" and for this purpose the carriage was regularly sent to the clergyman's residence. What a capacious receptacle is the wallet of Toryism! The Conservative and the O'Connellite both huddled together in Mr. CUSACK's satchel! CAMPBELL warming the cushions of Mr. CUSACK's coach, for the comfortable reception of a popish priest! It is too extravagant even for the exaggeration of the stage. Nothing, indeed, can be added to its *farcicality*; yet it is only an average specimen of Mr. CUSACK's ambidexterity.

The evidence of a man who has been conversant all his life with acts of professional duplicity and aggrandizement, must and will be duly appreciated when known. Let not his examiners, therefore, be imposed on by his representations. Let us but hear the questions, and we will tell the answers of Mr. CUSACK to each of them. If examined on the reconstitution of the College, for example, he will make every effort in favour of the institution of a council. And why? Simply to destroy every remnant of the popular system in the constitution of the College, and to convert it into an oligarchy such as there exists in London, that he may enjoy with less interruption and annoyance whatever advantages are derivable from a prominent place in a medical corporation. This, in fact, has been the darling object of Mr. CUSACK and his party for a length of time; and to attain it they will make every exertion. Alas, Mr. CUSACK! they have gone too far in civilization even in Ireland to retrograde into slavery and barbarism. They must advance, and bring even you along with them.

We almost feel a sort of humiliation in making the exposure of the worst parts of our nature a necessary part of that social regeneration, the structure of which should belong to reason alone. To the public it might be a matter of perfect indifference who or what Mr. CUSACK is or was, were he a private individual. Had his prosperity been the result of fair exertions, we should rejoice in it: were his opinions compatible with the good of society, we should commend them: but as the former are the consequences of injustice, and the latter are dangerous, we adopt the alternative of attempting to prevent a repetition of the evil of the one, and of limiting the malicious operation of the others, on an occasion which if they were unnoticed, would render them still more pernicious to society, and to the profession to which Mr. CUSACK belongs.

THE ARMY MEDICAL BOARD.

(*From our Edinburgh Correspondent.*)

In the account of the dinner of the Army Medical Officers, your reporter has aptly observed that Sir JAMES M'GREGOR had been actively employed in soliciting some, and ordering others, to attend the feast. In confirmation of the knight's enterprise on this occasion, I may inform you, though you will scarcely credit it, that in order to further his purpose on this occasion he sent an invitation, all the way to the north, to a professor of military surgery (BALLINGALL) to come up to London purposely to attend the dinner. The liberal system of the director-general of the army medical department, is however, perfectly understood here, and our military professor was too old a soldier to be induced by Sir JAMES to travel 400 miles for a dinner, though enriched with a speech from Sir HENRY HALFORD.*

The reformation, or, as it may be called, the *dissolution* of the Army Medical Board, which has lately taken place, has given much satisfaction here; and the present Government deserves praise for checking such a system of favouritism, corruption, and expense to the country, as certainly has not been surpassed in any of our public departments.

Sir JAMES M'GREGOR, in his speech, has not given a fair statement of the number of subscriptions which were levied directly by himself, or by his orders, on the medical officers of the army, and I must confess that nothing but compulsion, or an impression that it was necessary for my welfare in the service, would have induced me to subscribe the sums of money on those occasions, which I could ill afford.

The service of plate, valued by Sir JAMES at 1000*l.*, cost a greater sum; my share in it amounted to 10*l.* 10s.—a demand which was made upon me in the most indelicate manner by a letter from the ****** himself.

Soon after this a subscription was raised, to which I was obliged to add my guinea, to get a portrait of Sir JAMES painted by JACKSON. Then another subscription, for

* Staff Surgeon Kidd was absolutely ordered up from Portsmouth to attend the Medical Board dinner. The clerks of the Board were also ordered, by the late lord rector of the ancient college, to be present; and also were his Chatham dependants, whose important duties were left for the occasion.—ED. L.

a library at Aberdeen, was levied, for which I was called upon by the knight to pay ten guineas. I was afterwards besieged for one more subscription of two guineas, towards a piece of plate for Sir Wm. Franklin. Yet another subscription was demanded for a second picture of the knight, to be hung up in the museum at Chatham Hospital; and, last of all, a subscription is now levying for the purpose of printing a catalogue of the museum.

PRIZES AWARDED TO STUDENTS IN SCHOOLS OF MEDICINE.

To the Editor of The Lancet.

Sir,—In The Lancet of May 24th, you have made some strictures on the method by which prizes are awarded to medical students in the London schools, and in the last No. you have repeated the substance of your previous remarks. It was my intention to have replied to the first—an intention which I only relinquished from the persuasion that their importance would attract the notice of those who could more effectually answer them than myself. Since, however, my expectations in this respect have been disappointed, I feel myself obliged, however unwillingly, to undertake that duty, and I trust to your candour for the insertion of my present letter. I must state however, *in limine*, that what I have to say respects only the medical school of the University of London, with which alone I am acquainted. The practice of giving prizes I consider to be one of the most valuable parts of the system of education in this University. It is a *perpetual* stimulus to exertion, and has given to the students a character for industry such as could not, I believe, be correctly applied to those of any other school. Whatever, therefore, is calculated to raise a doubt respecting the fairness or the efficiency of the method by which the prizes are awarded, has a direct tendency to lessen their value, and, consequently, to diminish the competition for them, and to injure the institution itself. That student must have a tame soul, indeed, who could expend the energies of his body and mind to obtain what has been considered an honourable distinction, and then suffer his reward to be snatched from his hand without one effort in its defence.

Your first objection, which relates to the examinations being conducted in private, and to the teacher himself being the examiner, does not seem to me to have great weight. There could, I conceive, be no advantage in a *written* examination being public, and I am sure no *oral* one could ever be made efficient, for a man with ready wit and a good face would, in that way, carry the palm from one with twice his knowledge. The only argument which you mention (and it is the only one which can be mentioned) against the teachers themselves being the examiners is, that they might be partial; but, if we deny them every higher motive, for their own sakes, I think, they would avoid a practice which, if discovered, must for ever degrade them in the estimation of the school, and I hesitate not to assert that there does not exist a single fact in support of the notion that unfairness has at any time been practised here, if we except the occasional dissatisfaction of *one or two* individuals who never would be contented with any examiner who did not view their merits through the magnifying medium of their own conceit. Every teacher has peculiarities, both in the matter and in the arrangement of his lectures, and the answers which might be the very best to a series of questions culled from those lectures, might not appear so to another teacher whose views are different, but which we cannot reasonably presume to be more correct.

You have observed that "the successful competitor for a gold medal may obtain the prize, by giving not more than half-a-dozen correct answers to fifty questions. The winner obtains the prize, not because he has displayed an extensive acquaintance with the subject on which he has been examined, but merely because he has proved that he was better acquainted with it than his associates." These statements could never, I feel assured, be intended for us, because, if we admit the honesty of the teachers, it must be well known to the Editor of The Lancet, that no man under such circumstances could ever obtain the last certificate of honour. It is presumed that, in a large class, there will always be students of superior knowledge, and therefore that the fact of a man being at the head of such a class is a sufficient reason for believing that he has more than *merely relative* attainments. But, independently of this, when I inform your readers that in some of the classes between twenty and thirty certificates of honour are awarded, and that to gain the lowest of these it is necessary to obtain two-thirds of the aggregate value of correct answers to all the questions, they will not, perhaps, be disposed to doubt that the medalist must be one whose knowledge of the subject may be properly called "extensive," if compared with that of students in general. "In some in-

stances," you say, "the entire class does not amount to more than eight or ten individuals, and out of that small number it frequently happens that not more than two individuals volunteer to engage in the intellectual contest." These remarks are in no way applicable to more than two classes in this school—viz. those of morbid and of comparative anatomy. An attendance on these classes not being required by law, those who enter to them are almost invariably a superior class of students who attend them, not for the purpose of completing a curriculum, but for the valuable information which they are known to afford; and surely, Sir, it is not difficult to conceive that one of these students may deserve a gold medal as much as if the class consisted of two hundred. I cannot myself see what advantage could result from the adoption of your proposal to make the examinations compulsory throughout the class, for though it may have happened once or twice in the history of the University, that the best-informed student, either from a diffidence in himself, or from the fear of disgrace, has declined an examination—it would, I am sure, be found that a vast majority of those who required compulsion, would consist of men who were well known, both by the class and by themselves, to have no ground whatever for expecting to succeed.

Since this letter expresses the sentiments of many students besides myself, who feel that, from your very great influence, they must be injured by the observations to which it refers, I hope you will not consider it too long for a place in a Journal which, whatever failings it may have had, has accomplished more for medicine than the combined host of its predecessors and contemporaries. Believe me, Sir, yours, most respectfully,

DELTA.

University of London, June 16, 1834.

*** That the offer of a prize proves a stimulus to exertion with many students, cannot be doubted, but, as we before stated, it does not follow that the most industrious or the most competent individual is sure of obtaining it. Nay; a man who has studied hard, who has acquired a knowledge of the science to which he has devoted his attention, and who in the practical application of that science feels that he is secure of fame, will not incur the risk of being the lowest on the catalogue of competitors—will not hazard his reputation—will not incur the chance of degrading himself by engaging in a contest which he conceives there is a *chance* of being unfairly conducted. We know better, probably, than our correspondent, the reasons why *compulsory* examinations are not instituted in the schools, and if "DELTA" wishes to be better informed on that subject, we recommend him to put a question or two relating to it to the teachers, not only of the University, but of some of the recognised hospitals.

Our argument, which tended to show that the examinations were not considered what they ought to be, on the ground that the teachers might be partial in awarding the prizes, remains unanswered; and when our correspondent cannot conceive what advantages could arise from making "a written examination, public," he forgets that the principles and details of a written and oral scrutiny might be advantageously combined in the same examination. Our correspondent is wrong when he supposes that we doubt the *honesty* of the examiners. A man is not necessarily *dishonest* because he indulges in partialities. As the judgment is built up by the feelings, so may the predominance of any particular feeling bias a decision which, according to the judgment, is strictly correct and impartial. But the individual who gives the judgment may himself be the victim of impressions which another party might, by detecting, readily remedy and control.

ST. GEORGE'S HOSPITAL.

"Cur non
"Hunc JOB-UM jugulas? operum, hoc, mihi crede, horum est."

To the Editor of THE LANCET.

SIR,—It has been decided upon by the surgeons of *St. George's Hospital* that it would be the perfection of all good jobs if they could bring it to pass, that their offices should, for *the rest of their lives*, be-

come sinecures of five hundred pounds a-year. For the purpose of giving effect to this laudable project, they have decreed that for the future there shall be two assistant-surgeons instead of one, although it is reported that the present assistant-surgeon, Mr. Walker, has strongly protested against such an appointment as being altogether unnecessary, the work not being sufficient for the employment even of one assistant.

But what is it that lies at the bottom of all this? Is it the good of the hospital, as has been so loudly protested? No! This is the last thing thought of. The following explanation is, perhaps, nearer the truth: There is one Mr. Cutler who happens to be *Mr. Brodie's private assistant*, and it has been considered proper that he should be *provided for*. Accordingly a decree of the surgeons has gone forth, that he is to be the new assistant, whether qualified for the office or not, and it is confidently asserted that he received such information on the subject, previously, as has enabled him to commence a canvass for the votes of the Governors, before more deserving persons could possibly become acquainted with the facts. Will the Governors, as Cobbett says, "stand this?" I am, sir, your obedient servant, SCALPEL.

Great Russell-street, June 17, 1834.

To the Editor of THE LANCET.

SIR,—As your journal is at all times open to the exposure and correction of everything partaking of flagrant jobbing and knavery in medical matters, I consider no apology necessary for troubling you with the following details of the unprincipled line of conduct now being pursued at *St. George's Hospital*. You are, of course, aware of the so-much talked-of power and influence possessed by Mr. Brodie in carrying any measure among the Governors which he may think fit to propose, and as if to verify this allegation, he is at present endeavouring to pack the surgical staff of the hospital with another assistant-surgeon, in the person of one of his own former private assistants, viz., Mr. Cutler of Sackville-street. No notification of this proceeding was made to the present assistant-surgeon, Mr. Walker, until the day previous to that on which it was brought before the Board of Governors, and with a view to protract all discussion on the subject then, a requisition was brought forward, signed by four Governors, all intimate and personal friends of Mr. Brodie, viz. Mr. Powell, Mr. Keate, Mr. Babington, and Mr. Gaskoin; and, to make five names, Mr. Brodie added his own. The discussion of the merits of the case is to come forward on Friday the 27th inst., when both parties will meet. Every Governor of independent spirit is disgusted with the affair, and is determined to oppose it to the utmost of his power. The hospital is barely large enough to afford occupation to the present number of surgeons, and an extra-assistant will only prove an interloper, and an idler in the institution. Besides, the thing is unparalleled in the other London hospitals, some of the surgical officers of which have declared themselves astonished at Mr. Brodie's conduct on this occasion.

My time will not allow me to enter more fully into the merits or demerits of this affair at present. You shall hear from me again, shortly, with further particulars of the transaction. Yours truly,

A GOVERNOR OF ST. GEORGE'S HOSPITAL.

To the Editor of THE LANCET.

SIR,—What is everybody's business is nobody's; and fearing you may not be made acquainted with the gross job about to be perpetrated at our hospital, I think it right to give you a hint of what is going forward, satisfied that you will not let it escape your vigilance.

There is a special court to be held on the 27th instant, to take into consideration the necessity of appointing an assistant-physician and a SECOND assistant-surgeon, —neither of which is at all required by the necessities of the hospital.

For the former there may be some show of pretence (the senior-physician having been for many months unable to attend from severe illness), but for the latter there is not even the shadow of a shade. The moving cause is, that Mr. Brodie has a *protégé* for whom he wishes to provide, and Mr. B. is labouring hard to create this appointment for that purpose, and that purpose only.

When Mr. Brodie presented the requisition to call the special court, he stated that he had had it in contemplation to apply for this office six months ago. Yet he kept it a secret, even from some of his colleagues (from whom he dreaded opposition), lest it might transpire, and prevent his *protégé* from securing his election before it became publicly known, thereby also deterring any other candidates, however talented, or however strong their claims might be on the hospital, from offering themselves.

You have, Sir, always evinced a praiseworthy sympathy for the only legitimate objects of a charitable institution of this

kind, viz. the poor patients, and you have ever taken the greatest interest in the welfare of the pupils. I, therefore, rely with confidence that you will not, in this instance, withhold your powerful interference if you find the interests of both are about to be sacrificed with wanton indifference to everything that should guide men holding such important situations.

I much fear that this will not reach you in time for you to give an intimation in your forthcoming number that your eye is upon them. The affair will not bear the light. I have the honour to be, Sir, your obedient servant,

A PUPIL OF ST. GEORGE'S HOSPITAL.

June 17th, 1834.

HOPITAL DES VENERIENS, PARIS.

ON THE USE OF THE PROTO-IODURET OF MERCURY IN THE VENEREAL AFFECTIONS OF CHILDREN.

THE following cases will serve to give an idea of the treatment pursued by M. RICORD:—

CASE I.

Calmelle (Virginie) was received into the hospital on the 19th November, 1833. At the time of this child's birth her mother was free from any venereal symptom, having been cured a month before. At the age of two months the infant was afflicted with mucous papulæ on the vulva, on the upper and inner part of the thighs, round the anus, neck, and circumference of the mouth. During the first fifteen days her mother merely washed the parts with mallow water. On being received into the hospital, M. RICORD prescribed emollient baths, and a few days after, lint moistened in white-wash was applied to the vulva. On the 24th of November she commenced to take the pills of proto-ioduret of mercury. On the 29th the mucous papulæ had begun to lose colour, and were pale; several of those on the labia had disappeared. On the 7th of December nothing remained on the face except a few brown spots: the skin here was supple and smooth. 10th. All marks of the disease have disappeared, with the exception of a few spots on the vulva. 14th. Convalescent. It is here right to notice one fact which M. RICORD has frequently observed in his wards; viz. that although the child's mouth was the seat of a great number of mucous papulæ in a state of ulceration, the mother's nipple was not affected in the slightest degree by the constant contact of the pus.

CASE II.

Silon (Augustine), aged 18 months, received the 3rd of February, 1834, a month after the birth of this child. The vulva, anus, and inner parts of the thighs, were covered by mucous papulæ, which continued for sixteen months. Mercurial frictions and applications were employed, but, instead of relieving, seemed to aggravate the disease. At the time of her entry into the hospital, the parts just mentioned were the seat of a large prominent patch of mucous papulæ, which appeared to be only divided by the natural folds of the skin. Baths and emollient cataplasms were prescribed for the first ten days, and then compresses, with white-wash, were applied; and on the 13th of February the proto-ioduret pills, with a sudorific tisan. The infant took a pill every fourth day. On the 28th the mucous patches had become pale, and presented very little elevation; they gradually disappeared after the fourteenth pill, and the patient was perfectly cured on the 20th of March.

CASE III.

Lafosse (Vincent), aged two years, came in on the 7th of January, 1834. This child was in the habit of sleeping with his grandfather, who had been for a long time affected with chancres and ulcerations in the throat. In consequence of some infamous attempts the child became infected, and twenty days after, a syphilitic pustular eruption declared itself; the anus, scrotum, and thighs, presented numerous ulcerated papulæ. After twenty-five days use of the pills this child was completely cured; the papulæ on the thighs first disappeared; then those on the scrotum, and, finally, those about the anus. The disease began to give way after the fourth pill had been taken.

The following is the formula for the pills employed by M. Ricord at the Venereal Hospital.

℞ *Proto-iodur. Hydrarg.* gr. $\frac{1}{8}$;
Extract. Opii Gummos gr. $\frac{1}{48}$;
Extract. Guaic. gr. j;
Thridac. gr $\frac{1}{2}$. Misce. Fiat pil. una.

Such are the formula and dose of the proto-ioduret of mercury for children up to six months. After this we may gradually give $\frac{1}{6}$, $\frac{1}{4}$, or $\frac{1}{3}$ a grain, according to the age.

BOROUGH OF FINSBURY.

TO THE MEMBERS OF THE MEDICAL PROFESSION, ELECTORS OF THE BOROUGH OF FINSBURY.

GENTLEMEN,—In consequence of the appointment of the Right Honourable ROBERT GRANT to the office of Governor of Bombay, it is expected that a vacancy will soon be declared in the representation of the BOROUGH OF FINSBURY. It will be recollected that at the last election,—without having canvassed personally a single voter,—without having incurred any pecuniary expense whatever,—entirely by the exertions of an energetic, patriotic Committee, there were recorded in my favour two thousand one hundred and fifty-one votes, embracing the extraordinary number of fifteen hundred *plumpers*.

Encouraged by such a flattering position on the poll, and feeling grateful in the highest possible degree for the unprecedented exertions of the independent Electors, I pledged myself, at the conclusion of the election, to come forward as a Candidate on the occurrence of the first vacancy, provided I continued to retain the confidence of those Electors who had afforded me such independent and distinguished support.

Once more called upon, then, by the members of the Committee—including the Chairman of the six hundred Requisitionists at the last election—I cheerfully embrace the earliest opportunity of announcing that I shall confidently redeem the pledge I gave on the hustings, and present myself, as a Candidate, to the Electors of the Borough, the moment the Right Honourable ROBERT GRANT shall resign the great trust which has been committed to his charge.

I have the honour to be,
Gentlemen,
Your faithful servant,
THOMAS WAKLEY.

Greenford, Middlesex,
June 19th, 1834.

ST. MARGARET'S AND ST. JOHN'S, WESTMINSTER.—(*From a Correspondent.*)—MR. JOHN MAITLAND, who was recently in the minority at the election of assistant-surgeon at the *Westminster Hospital*, was on Wednesday last elected surgeon to the Infirmary of the United parishes of St. Margaret and St. John, Westminster, vacated by the death of Mr. Ollier. This selection reflects the highest credit on the guardians of the poor, in whom the appointment is vested. Mr. Maitland has extensive professional and literary acquirements, and is very generally esteemed for his strictly honourable character and gentlemanly deportment. His kindness and attention to the sick, are also qualities essentially requisite in an officer whose duties constantly bring him in attendance on the wretched dependants of a parish workhouse, in many of whom is exhibited the wreck of former wealth and station. The numbers were, for Mr. Maitland, 32; for his Opponent, 8. This result is the more gratifying, from the fact that Mr. Maitland had to contend with the party opposed to his election at the Hospital.

CORRESPONDENTS.

IT is impossible that we can insert the letter which M. Moscati has addressed to the editor of another publication. In the first place, we have always declined to make our columns the medium of controversies which did not originate in our pages, and with the correspondents of this journal. If we were to open our columns to the refutation of the falsehoods which are printed in some of the unprincipled periodicals of this metropolis, but little space would be left to us for the insertion of articles embracing the details of science. With regard to the questions which M. Moscati has put to us, we can have no possible motive for withholding from him correct replies. The letter signed "S. B. R." on the introductory lecture of Mr. Green, was received from Dr. Elliotson, at a period when we were unacquainted with M. Moscati. As to what M. Moscati has stated relative to his attendance at the College of Physicians, we have ground for believing that some of his assertions are correct, but with regard to others we cannot vouch for their accuracy, as all the circumstances did not fall under our observation. A brief report of the proceedings of the College was furnished by M. Moscati on that occasion, but only three or four words of it were printed in the article which actually appeared in THE LANCET.